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EDITOR.

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EDITORIAL.

WE are glad to announce that William S. Pearsall, Ph. B., M. D., has consented to become an associate editor on the JOURNAL, in the department of laryngology. As the senior assistant surgeon in the throat clinics of the New York Ophthalmic Hospital, Dr. Pearsall's long service and valuable experience render his co-operation especially desirable, and we are much gratified at this efficient re-enforcement of our working staff.

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WE regret to learn that some of our contributors have failed to receive extra copies of the JOURNAL. In order to obviate any trouble of this nature in future we have made arrangements with the publisher by which each author will receive twenty-five reprints of his article gratis, and a price list of extra reprints will be published in each JOURNAL. The contributor will have a receipt in blank sent to him which he will kindly sign as soon as reprints arrive and send to the editor in person, thus enabling us to know the exact state of affairs in each case. Any contributor failing to receive his reprints within two weeks after the publication of the JOURNAL will please notify the editor.

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IN our next number we shall begin the publication of a series of articles on homeopathic therapeutics as applied to the departments covered by the JOURNAL. The plan

is to take up the remedies in alphabetical order, and show their respective spheres of usefulness in these special lines.

The authorship will be as follows :

Ophthalmology, Charles C. Boyle, M. D. ;

Otology, Wm. E. Rounds, M. D. ;

Laryngology, A. W. Palmer, M. D.

These gentlemen are all surgeons to the New York Ophthalmic Hospital, and the knowledge gained by years of experience in the large clinics of that institution should make the articles of special interest.

ENOPHTHALMUS.

BY M. RUTH WORRALL, M. D., NEW YORK CITY.

THE following case, observed in the clinic of Dr. N. L. MacBride at the New York Ophthalmic Hospital, is of special interest because of the grave condition following so slight an injury, there being an absence of all systemic disturbance, and at the time of the injury the only local discomfort was the ptosis, thus forming a marked contrast to almost all of the reported cases; many giving history of fracture of the orbit and a great number presenting cicatrices; the latter condition occurring so often that at least one author (William Lang) considers it as one of the characteristic symptoms of traumatic enophthalmus.

G. A. R., forty years of age, a native of Ireland, entered the clinic at the New York Ophthalmic Hospital, giving the following history: Eighteen (18) months ago, while passing through a doorway, the door, swinging back, struck him on the left side of the face, just below the temple; but the force was not great enough to cause him to fall. The upper lid drooping, he poulticed it with apples, and three days after the accident he entered an infirmary in his native land, the eye still being closed; but at no time was there any swelling or discharge, and as he expressed himself, "there was no hurting." While in the hospital he received several injections of strychnine, and after a time was enabled to raise the lid a little, just sufficient to see.

One peculiarity was noticed by the patient; although having always been subject to headaches, yet since the accident they have not increased, but on the contrary have rather diminished.

On October 5, 1894, the patient presented a divergent strabis-

mus. In the left eye there was ptosis, the ball much retracted, being five (5) millimeters further in the orbit than the right eye (measuring from the anterior surface of the cornea to the plane of the brow); the cornea was normal; pupil slightly dilated; sensitiveness normal; muscular action was weak.

Vision, right eye, $\frac{20}{15} + .25$ D.^s = $\frac{20}{15}$; left eye, $\frac{20}{40} ? + .75$ D.^c
ax. $180^{\circ} = \frac{20}{15}$.

Near vision + 1.50 D.^s in addition.

Punctum proximum, right eye = 10 inches.

Punctum proximum, left eye = 14 inches.

The man's general condition was very good indeed, well developed elsewhere, making the retraction of the globe more marked. In no other case reported does this result obtain from so seemingly slight cause with so few local symptoms, and with none relating to the general system.

Enophthalmus, the retreating of the eyeball within the orbit, is one of the rare abnormal conditions occurring in the practice of an oculist; many text-books not even mentioning the possibility of its appearance.

Panas and De Schweinitz both speak of its occurring both idiopathically and traumatically. Schwarzschild, in an article in the *New York Medical Record*, mentions incidentally a congenital palimptosis (the term used by him for enophthalmus) due to an arrest of development of the cellular tissue. Stellwag speaks of "enophthalmos spastica," where the ocular muscle being in a state of tonic spasm, the globe looks fixedly forward or somewhat obliquely, and recedes into the orbit, at times so much so that the conjunctiva lies over the cornea in folds, the lids are generally open, more rarely spasmodically closed, but in all cases immovable.

The idiopathic (possibly might be called the secondary) form is found in cases of extreme emaciation, in cholera patients after a few hours, caused by the rapid absorption of the orbital fat and depletion of the liquid elements of the blood: after extreme hunger, night watching, etc.; it is also sometimes seen in old people, due to senile atrophy; it has been found in neurotic atrophy of the face, and

Bronner tells of a case where an enophthalmus followed the subsidence of a pulsating exophthalmus.

Bjorstrom reports a case of periodical enophthalmus coincident with an attack of trifacial neuralgia, and Borwinkle an analogous case due to paralysis of the sympathetic.

Sattler reports a case in which the patient from childhood had, ordinarily, an eye deep in the orbit, but upon certain efforts, especially when bending the head forward, the enophthalmus became an exophthalmus. Also, Schwarzschild reports an enophthalmus (caused by traumatism) occurring in a coachman, the ball being six millimeters behind the plane of the other eye, but on bending the head at right angles to the body the eye protruded six millimeters in front of the plane of the other eye, thus making a total excursion of twelve millimeters.

The traumatic variety is more common, and a number of cases have been reported:

CASE I. Himly speaks of an enophthalmus resulting from a blow in the ocular region. When the patient was seen by the physician, it seemed at first as if there were a growth on the stump left by an enucleated eye, but on raising [the lid the globe appeared possessed of its mobility and visual force.

CASE II. Neiden tells of a mason buried for an hour and a half in the ruins of a falling house. He noticed the pushing back of the eye; and four days after the accident there appeared a slight depression on the upper lid, with signs of increasing atrophy. The globe retained its muscular power and vision remained normal.

CASE III. Talko reports the case of a soldier having the right eye contused seven months before the doctor saw him. The globe became retracted little by little, and the sight diminished by definite degrees; the left eye, slightly pushed back, could count fingers at three meters. No ophthalmoscopic lesions were present in either eye. There were lively, sharp pains in the head, and finally total blindness in the left eye, as there unexpectedly occurred an injection of the conjunctival vessels, dilatation of the veins of the retina, and ulceration of the cornea.

CASES IV., V., VI. Gesner gives an account of three cases:

(a) Due to fracture of the inferior maxillary and cheekbone of the right side; five days later there was a non-adherent cicatrix in the superciliary region, an enlargement of the groove at the exterior angle, with ptosis of three millimeters; vision normal. (b) A miner received a load of coal upon the right eye, causing him to become senseless. Four days after the injury there was a non-adherent cicatrix of the lid, with an enophthalmus of about two millimeters: fundus normal, vision $\frac{1}{8}$. (c) Also occurred in a miner; but this time the cicatrix was adherent, directing the canal to the root of the nose. (Norris and Oliver, in their text-book, speak of epiphora sometimes being caused by enophthalmus, the lid having lost its accustomed support.) Two weeks after the accident there was an enophthalmus of three millimeters, motion of the globe restricted in looking up and out, from paralysis of the abducens, with homonymous diplopia; fundus of the eye and vessels normal.

CASE VII. Nagel reports an enophthalmus of three millimeters following a kick of a horse, the root of the nose being the site of the injury.

CASES VIII., IX., X. (Reported by Scharpinger.) (a) A girl of eight years, falling upon the right temple, became unconscious. Immediately there followed a retraction of the globe; vision = 1; fundus of the eye normal, except a slight dilatation of the vessels; motion of the eye and pupillary reflexes retained intact. (b) A coachman, aged seventeen, four months before presenting himself for treatment was kicked by a horse, receiving the blow in the right orbital region. The shock was so severe as to cause him to become senseless. After the reduction of the swelling of the lids the patient proved he saw less on that side. A month later there was a non-adherent cicatrix, with an enophthalmus of six millimeters. Movements of the globe the same as in the other eye; sensibility of the face, conjunctiva, and cornea normal; pupils somewhat dilated and sluggish in action; refracting media only partly transparent; papilla discolored; vessels contracted; the vision—with the right eye patient counts fingers at five meters, H. of 1.50 D.; emmetropia of the left. (c) A woman, thirty years of age, had, when a child of eight, received a blow upon the left cheek. There is now enophthalmus of the same side, with ptosis; extrinsic ocular muscles normal in action; pupil normal; fundus physiological.

CASE XI. Löw: The patient received a blow from a horse's foot on the left eye, causing loss of consciousness for two days. Now there is enophthalmus of six millimeters, pupil is dilated, refractive media clear, optic nerve in the beginning stages of atrophy.

CASES XII., XIII. Beers relates two cases—the first a boy of fifteen, who, eight days after a fall under a stone, developed an enophthalmus of the left eye. Vision = 1., fundus normal. (b) Patient received a blow from a horse's foot in the right eye. There followed loss of consciousness and vomiting. Some time after this there was a linear non-adherent cicatrix, ptosis, enophthalmus, partial iridodialysis, venous pulse, and a slight neuroretinitis; tension normal.

CASE XIV. is one reported by Lang. A boy thirteen years of age, running in the street, was struck by the shaft of a cart which was being driven at a trot. The blow knocked him down, but he got up and ran home, where the wound in the lid was immediately sewn. For twelve hours after the injury he bled profusely from the nose, but was never unconscious, only wandering slightly for a few minutes on awaking from sleep, and that only during the three days following the injury. The lids were greatly swollen and closed. When the swelling subsided it was noticed that the right eye was sunken in the orbit. A little over a year after the accident it looked as if there were a small artificial eye in the right orbit, while a non-adherent scar marked the upper lid; the right fissure was four millimeters shorter and four millimeters narrower vertically than the left; the disproportion only becoming greater on opening the lids to their widest extent. The right cornea was eight millimeters behind the level of the left. The left pupil was $5\frac{5}{10}$ millimeters in diameter, while the right was $7\frac{5}{10}$ millimeters, somewhat pear-shaped, with the narrow end downward; the iris being only slightly responsive to light and convergence, its lower part being immovable.

Right eye = 12 J. $\frac{6}{18}$ + 1.25 D^s C + 1.25 D^c. ax. 80° = $\frac{6}{9}$; for near vision + 3.5 D^s C + 1.25 D^c. = 1 J. Left eye = $\frac{6}{9}$; + .50 D^s.

There is diplopia, except when looking horizontally forward, with head thrown back.

Lang makes a subdivision of the traumatic variety:

1. Those cases where the eye is lost to view, and is only

discovered after a careful search among the folds of the conjunctiva.

2. Where the cornea is quite visible, but the globe is situated in a plane posterior to its normal position, thus appearing like an artificial eye.

In the first subdivision there are two cases reported (Von Becker and Tweedy), both having been caused by a cow's horn driving the globe into the antrum of Highmore, through a perforation of the lower orbital wall. In the case reported by Von Becker the sight was retained, but useless, as the cornea was directed upward and forward, covered by folds of conjunctiva, and firmly fixed by adhesions. In Tweedy's case the eye was excised, as it was blind. The operation was exceedingly difficult because of the numerous firm adhesions.

Of the second variety Lang had only known of five cases, and as in four of these cases there was a scar over the eyebrow, a drooping and retraction of the lid, a narrowed palpebral fissure, a limited upward movement of the globe which was retracted into the orbit, Lang calls these the characteristic symptoms of enophthalmus; but, as in other cases, characteristic symptoms are sometimes found most decidedly wanting; although scars are found in a number of them, yet the apparent cause of enophthalmus in some cases was so slight as to cause not even a bruising or contusing of the face, as in the case seen in the Ophthalmic Hospital, and in case X. it is particularly mentioned there was no cicatrix. Sometimes the motions of the eye were normal; in many cases the pupil was dilated and power of accommodation weakened, but if distant vision was not perfect, yet with the aid of lenses the patient saw perfectly. Whether or no the retraction of the globe made necessary these aids we have no means of telling, for we have no record of these patients' visual acuity before the accident.

The symptoms vary from a slight local discomfort to disturbances of the general system, such as nausea, vomiting, and even unconsciousness.

Enophthalmus in the horse is sometimes caused by tetanus in the retractor bulbi, a muscle which is only partially developed in man.

The cause in man is at present unknown; theories are many and various, each person who reports a case advancing a theory.

Himly supposes that the shock, after dislocating the tendon of the trochlearis, was the cause of the retraction of the eye into the orbit.

Talko attributes the trouble (post-traumatic) to the vaso-motor nerves causing the absorption of the fatty cushion of the orbit.

Gesner says the retraction of the globe is due to the extension of the inflammation (with its usual results) to the fatty tissue.

Scharpinger thinks the changes are due to paralysis of the filaments of the sympathetic which supply the orbital muscle of H. Müller.

("The inferior orbital fissure is closed by a fascia with which numerous smooth muscular fibers are interwoven [muscularis orbitalis of Müller]. These are innervated by the sympathetic, and it is therefore supposed that the slight recession of the eyeball in paralysis of the sympathetic depends upon the relaxation of these fibers.")

Löw attributes enophthalmus to cicatricial contraction of the fatty tissue after fracture of the bony walls.

Beers thinks the vaso-motor nerves are at fault.

Fuchs speaks of enophthalmus following injuries, but says in most cases the traumatism does not affect the eyeball itself, but the upper margin of the lid.

Nuden looks upon the enophthalmus following as being due to cicatricial contraction of the orbital tissue caused by the injury. Lang, on the contrary, believes that the case is one of indirect fracture of the lower wall of the orbit, with opening into the antrum of Highmore; as a result of this, the space occupied by the orbit would be enlarged, so that the eyeball is pushed back by pressure of the external air.

Norris and Oliver say enophthalmus, usually accompanied

by diminution in size of the fissure of the lids, is produced when the cellulitis induced by any of these processes (presumably traumatism) is chronic, of low grade, and is accompanied by an absorption of the orbital fat.

Of all these theories advanced, that of trouble in the sympathetic nerves would seem the most plausible, as that would explain the condition resulting from other than traumatic causes; it would also explain those directly traceable to blows, in fact it would account for the state resulting from slight blows (Dr. MacBride) which could not possibly have caused a fracture, and the theory would not be nullified if there were a fracture, as there the sympathetic would in all probability have been injured; but theory can only be settled truly and beyond doubt by numerous *post-mortem* examinations, and as the condition is rare and moreover is not fatal in itself, there does not seem any chance to verify this theory in the near future.

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ANTITOXIN.

BY EMANUEL M. BARUCH, PH. D., M. D., NEW YORK CITY.

THE credit of first having used bacteriological products for the cure of disease is due to homeopathy. Nothing will prove a better and more general exponent of its laws at all times than true science, and nothing will render more speedy aid in the general propagation of its principles than the most modern and most important product of medical science—viz., bacteriology.

I have omitted no occasion to call attention to this fact, and am again sustained in my assertion by the latest discovery in the field of bacteriology—the “heilserum” (curative serum), or “antitoxin,” as it has been misnamed. Of the success of this remedy there can be no just doubt. While we have learned to mistrust statistics, the observations which have reached us from very different and very competent sources are entitled to great consideration, and more especially when verified by our own experience.

Diphtheritic heilserum has now been used in many thousand cases, and whatever deductions have been made are certainly not without foundation. Serotherapy, even in its present form, is nothing new. As early as 1889 Behring, to whom alone is due the credit of this discovery, published his first experiments on the subject. Its popularization has not, as many believe, been rapid, but slow; as the profession in general had enjoyed a well-deserved lesson shortly before in the case of Koch’s “tuberculin,” and was still possessed of that useful scepticism so rare regarding the acceptance of new remedies.

The difference between Behring's and Koch's therapeutics is very decided. Koch, as well as Pasteur, represents isopathy, and they are successful in so far as they approach homeopathy. Behring's success is the greater the nearer he has succeeded in complying with the law of similia. It is a matter of daily experience that individuals having suffered one attack of an infectious disease prove immune against a second attack of the same disease, for a certain period at least.

The reason of this has been found in certain substances which are formed in the blood of such individuals, and have a protective influence against the poison which has produced them.

If these substances (antitoxins) are transferred from man to man, or from animal to man, they have the same effect on the individuals inoculated as though they had suffered an attack of the disease in question—*i. e.*, they will, for a certain period and to a certain extent, be rendered immune against this disease.

The mode of obtaining the antitoxin is simple. An animal, preferably a horse, is rendered immune by inoculating at first minimal, then gradually increasing doses of diphtheritic poison. The toxin used is either pure or modified by application of heat or chemicals, which latter really approaches a "simile" rather than an "ison."

A horse which would at first have succumbed to a few cubic centimeters of toxin will at last tolerate nine hundred or one thousand cubic centimeters of the poison without much discomfiture. The efficacy of the antitoxin increases in direct proportion to the degree of immunity of the animal inoculated.

After having attained the required stage of immunity the animal is bled, which can be done with impunity every three or four weeks, and the blood received into sterilized glass cylinders. Here it is allowed to settle for about twenty-four hours, when the serum is carefully poured off the coagulum. To this serum we add 0.5 per cent. of carbolic acid (in preference to melted camphor), and the prepa-

ration is ready for use. It can be preserved for an indefinite period, if shielded from light.

The power of antitoxin in influencing the course of diphtheria cannot be doubted by anybody who has tried it, however varied opinions may be.

It will certainly not prove a "cure all," but it will cure every case of pure diphtheria if treated sufficiently early.

Its efficiency will be doubtful, however, and frequently disappointing under the following conditions, viz.:

1. When the toxic effects of the diphtheritic poison have pervaded the system.
2. When the germ of diphtheria is associated with other germs, more especially with streptococci.
3. In diphtheritic bronchitis—*i. e.*, when the membranes extend into the bronchial tubes.

In diphtheritic croup the results of serotherapy have been gratifying. The antitoxin impedes the further development of membranes and aids in their detachment, thus greatly decreasing the necessity of tracheotomy.

Where tracheotomy has been performed, the use of antitoxin must still be recommended. By accelerating the detachment and expectoration of the membranes it renders an earlier removal of the canula possible, which, under all circumstances, is desirable, especially in view of the danger of pulmonary infection.

The abandonment of local treatment in diphtheria is another of the valuable achievements of this remedy, an achievement which we have so frequently pleaded for in vain.

The "heilserum" is best inoculated below the axilla, or on the thigh. Its effects are rapid. Within twelve hours the membranes detach and the fever falls in due proportion to the pulse. I have found a child who had been deathly sick the evening previous sitting up in its little bed playing the next morning, after a single inoculation.

If no improvement ensues within twelve hours a second injection of greater strength should be applied.

No evil effects have been noticed after the use of this

remedy, except in some cases a slight rash resembling urticaria. This, I think, is probably more due to some impurity adhering to the preparation than to the antitoxin itself. Its effects are physiological rather than pathogenic, and therefore offer no impediment to the application of our remedies. From every point of view, therefore, this valuable product is worthy of the due consideration of the profession, even though the discovery of new remedies be less of a necessity to the homeopathic school than to any other.

PERNICIOUS ANÆMIA, DUE TO EYE STRAIN.

BY J. E. MANN, M. D., OMAHA, NEB.

THE case I present in this paper was one of unusual interest to me, because of the perplexity and annoyance it caused me at the time, and the rapidity of the cure when the cause was discovered.

I had treated the girl two years before for post-nasal and pharyngeal catarrh, and watched her during that treatment develop from a thin, ill-complexioned girl, into a strong, well-developed young woman, with ruddy complexion, and seemingly all the health and vitality one could ask for.

In the fall of '92 she commenced teaching school in the country. Soon after, her color began to fade, appetite failed, could not stand exertion either mental or physical, became nervous, easily startled ; a dry, hacking cough, pain and soreness through chest, with bloodless lips, and a hectic cheek rapidly developed ; not much headache, but a continual dizziness was complained of. Thus the case presented to us January 21, 1893 ; age, nineteen years. A careful physical examination revealed no structural lesions, lungs and kidneys acting normally, urine normal, with but a slight increase in amount ; slight anæmic murmur above heart, pulse 110, temperature subnormal.

No cause could be found for the condition, and I frankly told her mother that I was at a loss to account for it. She was afraid of heart trouble or consumption, and when put at rest on those points, being a stanch believer in homeopathy, she told me to do my best and she would be satisfied. To say I was perplexed is putting it mildly. Dr. E. N. Leake, my partner, whose interest in the case was equal to mine, was consulted, and together we treated her for seven months. She gradually grew worse ; fever

set in with a more decided hectic, heart murmur increased, sharp pains all over the body, weight and load in the stomach, all food disagreed, especially fats; melancholy became a prominent feature; insomnia, headaches, and dizziness increased, as also the polyuria; menses late, scanty, thick, dark, and sticky. I became disgusted with myself. I knew there was a thorn in the flesh somewhere, but was unable to find it. The medicines used were ferrum phos., calc. carb., calc. phos., Hensel's tonicum, mag. phos., puls., bry., ars., phos. acid, and uranium nitrate. With these we could check the polyuria, relieve the chest symptoms, and give temporary relief for some of her symptoms.

On August 30 she could scarcely walk up an easy stair to our office. It was then she admitted to me that her eyes gave her some trouble, and that she would not admit it before "because she knew I would put glasses on her." That was the thorn. The ophthalmoscope showed myopic-astigmatism, with a —.50 D^c., axis 180° in each eye—vision normal. I gave her these glasses and continued same remedies she had been taking for some time, ars., and cemic.—with a result that would convince the most rabid unbeliever in reflexes; for in just three weeks she came in to pay her bill, saying, "she never felt better in her life," and truly she looked as she talked. Fever all gone, skin ruddy and healthy, appetite good, increase in weight, no dizziness, bright and cheerful as of old, said she did not want any more medicine, as the glasses were enough for her. I did not insist on more, you may be sure.

This case has been a good lesson to me. I have learned by it and several others: 1. That our patients are many times apt to deceive and mislead us concerning their cases, because of a dread of the treatment they are sure will be used to effect a cure, if we discover the real cause. 2. That we must depend as little as possible on subjective symptoms. 3. That simply prescribing for the symptoms of a case will not always suffice without direct reference to the cause. 4. That the supposed disease may be symptoms of reflex origin.

This woman had deliberately deceived me about her eyes; had told me she could see as well as anyone, without inconvenience. I believed, and did not test her. There I erred,

for five minutes' work would have demonstrated the cause without depending on her word. This is a common error, committed every day of our lives, and one for which we have no legitimate excuse, other than its common practice.

This case was given such remedies as were indicated. We both read up the case carefully, and the remedies were selected strictly according to symptoms, but with negative results. I firmly believe that Hahnemann himself could have had no better result with medicines and that without the glasses she would have been dead long before this.

It is not the function of this paper to explain why and how this condition was brought about by the eye strain, but to show that it thus resulted. I believe that many, if not all, our unyielding and obscure cases have their origin in a similar way, and no effort, mental or physical, should be spared that will tend to enlighten us as to the cause.

These reflex disturbances are due to an irritation of the sympathetic nerve somewhere along its course, but most frequently in the eye, ear, nose, throat, rectum, and cervix uteri.

The irritation being continuous, it is constantly transmitted to the spinal and brain centers until the reflexes develop, which in themselves are thus essentially of central origin, due to the continual central irritation, and are not functional.

This to my mind explains the uselessness of the indicated remedies in reflex disturbances.

EPITHELIOMA OF THE PHARYNX, ŒSOPHAGUS, AND LARYNX.

BY F. LINDLEY HOAG, M. D., GRAND RAPIDS, MICH.

THE rarity of this disease in this region is my only reason for reporting this case. I have nothing new to add in regard to the pathology or startling to relate as to treatment. Epithelioma either develops by an unhealthy ulcer or by subcutaneous induration which subsequently ulcerates.—*Greene*.

June 12, 1892. Dr. Deffendorf of Ionia brought Miss R., age forty-one, Scotch descent, to my office for examination of her throat. History: Some months previous had suffered from an attack of so-called *la grippe*. At this time suffered intensely from ulcerated sore throat (so called and so treated). From the attack of *la grippe*, until brought to my office by Dr. D., had received treatment based upon that diagnosis. When Dr. D. saw her he suspected the true nature of the case, and hence she was brought to me for my diagnosis and opinion. Patient very weak and emaciated, voice weak, but clear; no complaint of pain for some months past; apparently from the time when the ulcerated condition assumed the fungoid condition hereafter to be explained. Could swallow no solid food and very little liquid, having been able only to get one glass of milk down per day for the past ten days. Cervical glands much swollen on both sides, but much more so on the right. No family history of cancer or phthisis; had always enjoyed good health.

Upon inspection of the throat the first impression, as you pressed the tongue down, was that the patient had endeavored to swallow a small cauliflower and it had lodged in the fauces. Upon closer inspection I found a large growth occupying the first

wall of the pharynx, and extending from the top of the tonsils down to and involving about two to three inches of the esophagus. In size and shape it resembled one half of a large turkey's egg. The posterior pillars did not seem to be involved, but the right tonsil was, the left not. Owing to the immense size I could not at this time pass dilators into the œsophagus or get a view of the larynx. The breathing was fairly easy. Her most prominent complaint was hunger ; and, owing to this, I resolved to free the throat so that she could at least swallow liquids. After thorough use of eight per cent. solution of cocaine I began to remove the mass with curette and sharp cutting forceps ; and at this sitting succeeded in getting about one-sixth of an ordinary glassful of this fungoid mass. There was profuse bleeding, which I controlled with pressure and hyd. peroxide. That night she was able to drink about one quart of milk and two raw eggs. June 14 I again examined the throat. At this sitting I was able to pass a fair-sized dilator down the œsophagus, which I found somewhat nodulated in upper two to three inches and smooth below. I was also able now to examine the larynx, where I discovered the same fungoid mass. Could not see the vocal cords or any of the normal structures ; epiglottis was not involved, except very slightly along the right margin at the base, where it seemed to form a connecting link between the right tonsil and larynx. In the same manner I removed all of this I could, and then cauterized the nares with chromic acid (which I afterward regretted, for I was convinced it did harm rather than good). As she could now swallow liquids I let her go home, with instructions to come back in one week. I gave at this time a solution of iodine and acid carbolic with glycerine for spray and gargle, which always seemed to soothe the throat and help to free it from mucus. R., internally, ars. ix. I had several specimens of this examined under the microscope, and all reports agreed, epithelioma. Upon her return, June 24, she was much stronger, and reported that she could swallow some solids, and liquids easily. Growth had returned to some extent. From June 24 till October 7 she visited me at varying intervals, and I repeated much the same work. At first I was somewhat timid and worked with tremor, but soon grew bolder. I invented a hook by which I could, as the patient pressed down the tongue, draw the epiglottis forward almost on base of tongue and so see and work in the larynx.

Upon returning home after her visit October 7, the cervical glands became swollen, red, and painful, and in about ten days sloughed off, showing the larynx and several of the tracheal rings. I then saw her at her home, and upon examination of the inside of the throat found it had not grown any since last operation. Said she could swallow more easily since it had "broken." I advised an antiseptic wash, but did nothing further toward healing it. Could see she was growing more emaciated and weaker. This external sore gradually improved till by December 10 it was all healed. As soon as this occurred the growth on the inside took on new life, and I was sent for and again cleared the throat, on December 24. At this time the patient was comfortable; no pain, but weakness. January 18, 1893, repeated the operation, patient failing; and from that time till February 7, 1893, she gradually, peacefully, and painlessly sank into that sleep which knows no waking.

The only local medication used was the iodine spray and hyd. peroxide. The only internal remedy was ars. ix. The only pain suffered was during the external sloughing. No complaint of hunger was made after the first operation. Perhaps some might think a more radical operation was in order. I did not. I made no effort to prescribe according to symptoms, the ars. ix being given simply as a tonic. A careful study of the case would be more instructive to the general practitioner than the specialist. I have omitted to state that a harassing cough was present all through the case. There being no pain on swallowing, no cocaine was used except for operating. Of course, after each operation some discomfort was felt in the throat, but the iodine spray seemed to control that.

A CASE FROM PRACTICE.

BY C. C. BOYLE, M. D., NEW YORK CITY.

THE history of the following case is interesting on account of its termination. When first seen the patient had a purulent conjunctivitis from infection, which had gone on to ulceration of the cornea with hypopyon, and undoubtedly an irido-choroiditis, which stopped just short of a panophthalmitis. I soon checked the progress of the disease, using chlorine water solution for the purulent conjunctivitis, having the eye cleansed night and day as frequently as the discharge collected, and gave internally at first hepar s. i, followed by calc. hypophos. i. Under this treatment the case improved, and the ulcer slowly healed after it had extended through all the layers of lower part of cornea, except Descemet's membrane. To prevent perforation and adhesion of the iris, and also to form a wall of support for the cornea, I kept the pupil contracted by eserine, continuing its use for some time, to prevent secondary glaucoma and bulging of the cornea, which would appear if the eserine solution was discontinued.

The eye did very well under this treatment, and the corneal trouble went on to the cicatricial condition, forming a macula which covered the lower half of the cornea. For four or five months afterward the patient was obliged to use instillation of eserine off and on, as pain and signs of bulging of the cornea would appear, but finally I was able to do without it, and the haziness of the cornea was clearing up. Later on I intended to make an iridectomy, in the

hope of giving some sight as well as to guard against a return of the glaucomatous symptoms.

About one year from the commencement of the original attack the patient came to me for a slight redness and inflammation of this eye, which I thought was due to a cold from driving, and supposed it would be easily checked, but it kept increasing, considerable pain being present, showing that there was an inflammation of the iris. I used atropine for a day, but changed to eserine, as the increased tension appeared, and in spite of all my efforts it went from bad to worse. The lids became swollen, conjunctiva chemosed, and the eyeball very painful, and then, as a forlorn hope, I determined to make an iridectomy. On opening the eye pus presented at the point of incision, indicating suppuration of the whole eyeball. I then advised that, if there were no improvement in twenty-four hours, enucleation should be made. The next day, although the eye was no worse and the patient had less pain, I decided upon removal, which was readily consented to. After putting the patient under the influence of hypernitrous oxide, the eyeball was removed with some difficulty, as there were numerous adhesions from the original inflammation. After the operation I opened the eyeball and found a solid mass of fresh pus, which fully justified the course pursued. I believe it is considered doubtful whether it is advisable to remove an eye in the active stage of panophthalmitis, as there is danger of septic infection, but this does not seem so to me from my experience, as I have removed three or four eyes while in this condition, and I have never seen any bad result, but instead immediate relief followed, and there was no departure from the usual conditions following enucleation. This patient made a rapid recovery and is now wearing an artificial eye without any special inconvenience.

THE ANTITOXIN TREATMENT OF DIPHTHERIA.

BY WILLIAM S. PEARSALL, PH. B., M. D.

BEFORE entering upon a review of the treatment of diphtheria by antitoxic serum, it does not seem improper to give a very brief glance at the history of bacterio-therapeutics, which is a scientific development of the theory of isopathy, and as such has been called a branch of homeopathy. Before microbes and their ilk were known, the poisonous products of disease were used with some success as therapeutic agents. Since the wonderful advance in bacteriology, nearly every new discovery as to the microbic origin of disease has been followed by an attempt to use the special bacteria of that disease as a means in its prevention or cure.

Such attempts have, with one or two exceptions, proved failures, or at least have not, up to the present time, been made practically useful. The discovery of the special microbe of anthrax was followed by the unsuccessful treatment of that disease by an attenuated form of its bacteria. The discovery of the bacillus of tuberculosis by Koch was followed by the administration of an attenuated form of the bacillus produced by passing it through a series of animals. The result, as is well known, was, for a number of reasons, an almost complete failure, although "tuberculin" is now being used with a certain degree of success in the diagnosis of tuberculosis in cattle. The discovery of the special cause of rabies, and its application to the cure of the disease by Pasteur, presents a brilliant exception to the general rule

of failure. The reports of the *Institut Pasteur* in Paris show that of the 1840 cases treated there the total number of deaths was only 14, the average mortality being 0.76 per cent. In a series of 251 cases treated by other means (principally cauterization) there were 129 deaths, or 51.1 per cent. This is certainly a very gratifying result and serves to show that there is truth in bacterio-therapy, if only the proper method of preparation and administration can be ascertained.

All of these therapeutic methods depend upon the well-known fact that persons who have contracted and recovered from certain diseases are protected from future attacks of the same disease, it matters not whether its form were mild or severe. It is known also that the human system may be so accustomed to the presence of poisonous substances by their repeated use in increasing quantities that practical immunity may be established. If, therefore, knowing the exciting cause of a disease (its special bacillus), it could be administered in such a form as to produce a very mild type of the disease with its consequent state of protection, or if the protection could be produced by the repeated introduction into the system of increasingly virulent forms of the bacteria, the desired result would be obtained.

Acting upon this plan, a mild culture was secured by the inoculation of a series of animals, each receiving the disease from the bacillus produced in its predecessor. In this way the virulence was diminished, and a culture finally obtained sufficiently mild to be used without danger. From this series of cultures either those of the proper strength were selected, or, beginning with the mildest, cultures of increasing degrees of virulence were administered until the desired result was obtained. In either case the bacillus itself was introduced into the system; and the results, although not absolutely negative, were far from good; the treatment being sometimes followed by no effect, sometimes by too much, and very occasionally by such results as had been hoped for.

In 1883 Klebs announced the discovery of a peculiar mi-

crobe, which he found while conducting a series of experiments upon diphtheritic membranes during an epidemic of diphtheria which had occurred the year before. This bacillus had quite distinct morphological characteristics, and was always found in diphtheria, while the presence of other microbes was variable. During the following year, while experimenting with the new bacillus, Loeffler found that three parts of blood serum mixed with one part of peptone bouillon, containing one per cent. of grape sugar, formed the best culture medium, and that in this medium the bacillus diphtheriæ grew very rapidly, while an inhibiting effect was produced upon the growth of other bacteria that might be introduced at the same time. In this way he was able to isolate the bacillus and by inoculations of animals to reproduce false membranes, but in no case was the disease followed by post-diphtheritic paralysis.

In 1888 Roux and Yersin reproduced post-diphtheritic paralysis and thus established the causative relation of the Klebs-Loeffler bacillus to diphtheria. Continuing their experiments, they found that the culture medium used contained a very virulent poison, due to the toxins arising from the death and disintegration of the bacilli.

With these discoveries as a foundation, Behring and Kitasato began experiments upon animals with the toxins of tetanus and later with those of diphtheria. These experiments showed that by the injection of these toxins, beginning with a very small quantity and increasing it gradually, according to its action upon the animal, such a condition of immunity could be established that surely poisonous doses of a virulent culture of the bacillus diphtheriæ could be injected without harm. It was also found that the condition of immunity or protection existed in the blood of the animal immunized and was susceptible of transference with the blood serum to other animals, in whom in turn a like condition of immunity would be established. For example, a rabbit is immunized in the usual way by injections of toxins, its blood drawn, and the serum removed. If a determinable quantity of this serum be injected in another

rabbit and afterward a surely fatal dose of virulent toxin be injected, it is found that the toxin has no apparent effect. It was also determined that if a known poisonous dose of toxin was mixed with the proper quantity of serum, the mixture could be injected in animals with perfect impunity. Other experiments showed that if an animal were injected with such an amount of toxin as usually proved fatal in from thirty-six to forty-eight hours, and after symptoms of poisoning appeared a certain quantity of serum were injected, the symptoms would disappear and the life of the animal be saved. Repeated trials showed very uniform results, demonstrating the definite action of the remedy, and upon the evidence thus obtained is based the theory of serum therapeutics as announced by Behring and elaborated through the efforts of Roux, Kitasato, Yersin, and others. Broadly stated, the therapeutic action of "antitoxin," or as some prefer, "curative serum," may be said to be the transference of acquired immunity from an animal to the human subject.

What antitoxin is or how it is produced during the process of immunizing an animal is not known, nor is it determined what change, if any, takes place in the blood which gives its peculiar power over toxic infection. Whether the antitoxic action of the serum is due to something developed in the tissues and added to the blood in the form of new matter of some kind in solution in the blood serum, or whether it is due to the disintegration of the toxins themselves which form a new substance or substances having antitoxic properties, has not been demonstrated. The French school hold that the presence of the toxins in the blood stimulates the tissue cells to the production of certain defensive materials, which are called antitoxins. The Munich school, on the other hand, hold that the peculiar character of the serum is due to the breaking up of the toxins and the formation of other substances which are the antitoxins. The fact that antitoxin may be injected in a healthy animal without subsequent toxic effect, and is at the same time capable of antidoting a fatal amount of toxin,

shows that either antitoxin as a distinct substance has been developed in sufficiently large amounts to overcome the poisonous action of the toxins introduced during the immunizing process and also to nullify the toxin in the animal which is to be protected, or that the toxins themselves have undergone some change depriving them of their poisonous characteristics and perhaps resulting in the formation of antidotal substances. Further experiment may throw some light on this subject.

The first step in the process of the production of antitoxin is the preparation of the toxins to be used for immunizing the animals selected for this purpose. Experience teaches that during the active life of the bacillus little, if any toxin is given out; but upon its death and subsequent breaking up into the various nucleins, the substances known as ptomaines or toxins are set free. A rapid and active cycle of life is more conducive to the formation of virulent toxins than a slow and sluggish one, and the conditions that are the most congenial to the habits of the bacillus must be presented, if the best results are to be accomplished. Loeffler found that a mixture of blood serum, peptone bouillon, and salt, in the proportions described above, and called Loeffler's medium, furnished the happiest home for the bacillus diphtheriæ; that it was, moreover, inimical to the propagation of other bacteria which might be introduced at the same time, and that in this way isolation was easily accomplished. It was also found that certain conditions of heat and moisture were favorable, and that under such conditions the bacilli grew rapidly and multiplied, and that their length of life was shortened, and that after death a larger amount of more powerful toxin was found than under other circumstances.

Practically the process of obtaining the toxin is carried on along the line of these requirements as closely as possible. The first step is to select a virulent culture of the bacillus of diphtheria. These cultures vary so in strength that it is necessary to test them, and one is selected that will prove fatal to a guinea pig weighing five hundred

grams. A flask of alkaline peptone bouillon is inoculated from this culture and placed in a thermostat at a temperature of 36° C. After twenty-four hours it will be found to be rich in colonies of bacilli, and is used as a stock culture in the inoculation of others in which the toxins are to be formed. The culture flasks used by Dr. Roux in his laboratories in Paris are somewhat different from the usual form, and are known as the Fernbach. They may be described as a large, flat-bottomed Florentine flask, with the neck in the usual place and also a tubulature arising from a point about an inch from the bottom. When about to be put in use they are filled up nearly to the tubulature with alkaline peptone bouillon, cotton is put in the constrictions of the neck and tubulature, and the flasks are placed in the sterilizing apparatus. After a sufficient length of time has elapsed they are removed and each flask is inoculated with about 40 cc. of the bouillon culture of the bacillus diphtheriæ. The flasks are then placed in the thermostat for twenty-four hours, by which time the cultures have become well started. Each flask is attached to an aspirator, a current of air is kept passing through it, going in at the neck and out through the tubulature, the air, before entering, being passed through a water bottle. The flasks are kept at an even temperature of 37° C. for three or four weeks, when the culture medium will be found to be filled with rich, flaky masses, which are shown by the microscope to be composed almost entirely of the remains of disintegrated bacilli, with now and then a bacillus retaining only in part its normal morphological character. The cultures are now filtered through a Chamberland filter tube into sterilized flasks, and each lot is standardized by injections in guinea pigs; the virulency usually desired being such that 0.1 cc. will prove fatal to a five-hundred-gram guinea pig in less than twenty-four hours.

The solution thus obtained may be preserved unharmed for a considerable length of time, if kept at an equable temperature and protected from the light.

It is claimed for this method by Dr. Fernbach, its dis-

coverer, that cultivation in a current of moist air presents the best conditions for growth, and at the same time prevents the evaporation which would naturally take place; that the toxins obtained are stronger and have different characteristics than when other methods are employed; that the flasks show a more regular standard of strength, and that filtration removes the danger of abscess formation at the point of injection, and thus shortens the time required for immunizing.

The method of obtaining toxines practiced by Behring differs somewhat from the French method, as will be seen by the following description: Florentine flasks are filled half full of alkaline peptone bouillon, and sterilized. They are then inoculated with a fresh culture of the diphtheria bacillus of known virulence, and placed in a thermostat, the temperature of which is maintained at 37° C. After three weeks they are removed and a small percentage of iodine trichloride or carbolic acid is added to kill the culture. They are allowed to stand from sixteen to twenty hours, and are then tested for virulency; the standard of strength required being such that from 0.1 to 0.5 cc. shall prove fatal to a five-hundred-gram guinea pig in less than thirty-six hours. There is considerable variability in the strength of the cultures. It sometimes happens that not more than one out of ten or twelve is found to be of sufficient strength to be used. Owing probably to the retention of dead bacilli in the solution, an abscess sometimes occurs at the point of injection, and very seriously hinders the immunizing process, for the injections must be stopped and considerable time lost in waiting for the animal to recover.

Of the numerous animals experimented upon with a view to the production of antitoxin, the horse is very generally considered to be the most satisfactory. It endures the immunizing process better, shows less constitutional reaction, and furnishes a serum richer in antitoxin and larger in quantity than other animals. The horses selected need not be without blemish, so long as they are suffering from no

chronic communicable disease, as shown by a rigid physical examination, supplemented by injections of tuberculin and malein, although it is asserted that the presence of some diseases is not evidenced by such injections. Work horses, aged from six to eight years, that have seen better days and are somewhat broken down or lamed, but otherwise sound, are most frequently used.

In the early experiments in immunizing horses it was customary to prepare the injection by mixing together two parts of toxin and one part of Gram's solution.* In this way the reaction which follows the injection of toxin was obviated, and by increasing the proportion of toxin and diminishing the proportion of Gram's solution a large amount of pure toxin could finally be used. But it was found that the anti-toxin resulting from this mode of procedure was not as satisfactory as when the pure toxin was injected from the beginning. The first injection is small, usually 0.5cc., and its action on the animal is carefully watched. There is always some reaction; it may be little, or it may be quite profound, or even fatal; and its degree forms a guide for the quantity of the next injection, and the interval which is allowed to elapse before it is given. If after the first dose, or at any time, the reaction becomes dangerously severe, Gram's solution is mixed with the next dose, and if the symptoms are still serious it is used with the following injection as well. Usually one or two injections in which Gram's solution is used are enough to restore the health of the horse, and afterward the pure toxin may be continued. Before proceeding with another injection the constitutional effects of the previous one must be allowed to pass away entirely. At first careful watch must be kept over the animal to prevent an overdose, but the constitutional reaction gradually decreases, and by the time that doses of 50 or 60 cc. can be tolerated there is no general reaction; and from this time on the local œdema disappears more rapidly,

* Gram's solution consists of iodine, 1 gram; iodide of potash, 2 grams, in 300 grams of distilled water.

so that even with injections of 300 or 400 cc. of toxin the enormous œdema goes away in from twelve to eighteen hours, whereas in the earlier injections the œdematous inflammation lasts for several days.

The constitutional symptoms are manifested by a rise in temperature of from one to two degrees centigrade, *malaise*, loss of appetite, and sometimes cramps and other evidences of septicæmia. Death occasionally occurs, especially in the early stages. The local action is an œdematous inflammation at the point of injection, having a hard inflamed center and a soft œdematous periphery of considerable extent.

By injecting the toxin directly into the circulation instead of subcutaneously, a much stronger antitoxin is obtained, but the process is more difficult. It takes a longer time, and is attended with more danger. A stronger toxin is not enough more valuable to warrant the use of this method.

During the process of immunization little or no antitoxin is developed until frequently repeated, and enormous doses of toxin (300-400 cc.) can be injected at one time. If the serum be removed at a time when the horse is taking from 60-100 cc. and tested for antitoxin, very little will be found. The formation of antitoxin seems to depend upon frequent injections of a very large amount of toxin.

The time necessary to put a horse in such a state of immunity that the serum will yield the required strength of antitoxin varies. The milder form (1-50,000 of Roux) may be obtained in from two and a half to three months, while the stronger (1-100,000) requires from eight to nine months, and is attended with considerable danger of poisoning from an overdose. There seems to be a certain limit beyond which the animal is unable to go, and if the attempt is made to increase the dose, the toxic effect is manifested, and the animal dies.

A general idea of the amount of the toxin used and the intervals of injection may be obtained from the following quotation from the report of Dr. J. J. Kinyoun on "The

Treatment of Diphtheria by Antitoxic Serum": "First day, $\frac{1}{2}$ cc. of pure toxins, of which $\frac{1}{10}$ cc. is fatal to 500 grams of guinea pig; eighth day, 1 cc.; fourteenth day, $1\frac{1}{2}$ cc.; twentieth day, 2 cc.; twenty-eighth day, 3 cc.; thirty-third day, 5 cc.; thirty-eighth day, 8 cc.; forty-third day, 10 cc.; forty-seventh day, 20 cc.; fifty-first day, 30 cc.; fifty-sixth day, 50 cc.; sixty-second day, 50 cc.; sixty-eighth day, 60 cc.; seventy-fourth day, 100 cc.; eightieth day, 250 cc.; eighty-eighth day, 250 cc.;" and so on until 400 cc. is given at a dose.

When the proper degree of immunity has been reached, the blood is removed by means of a trocar and cannula introduced into the jugular vein. The trocar is large, and the cannula is so arranged that a rubber tube connected with a piece of glass tubing may be attached. All the instruments used are sterilized and kept in a five per cent. solution of carbolic acid. The glass jars in which the blood is received are covered with paper caps and thoroughly sterilized. When everything is ready the horse is blindfolded and firmly held. The place selected for the introduction of the trocar is shaved and thoroughly cleansed with a five per cent. solution of carbolic acid. An incision is then made through the skin, and the jugular vein firmly compressed by the hand while the trocar is thrust downward well into it. The glass end of the cannula is plunged through the paper cover of the jar and the trocar removed, allowing the blood to flow through the cannula into the jar. Six to eight quarts are removed from the horse at one time, and from this two to three quarts of serum are obtained.

The jars containing the blood are allowed to stand until coagulation has taken place, and are then put in an ice-box. After about twenty-four hours the serum will have separated, and may be removed with a pipette or siphon into the flasks in which it is to be preserved. If it is thought that the serum has been contaminated in any way, or if it is desired that it be kept an unusually long time, it may be filtered through a Chamberland filter tube.

Several substances are used to preserve it and prevent

decomposition. Dr. Roux drops into each flask a small bit of camphor. Professor Behring used a solution of trikresol, and lately has found a 0.5 per cent. solution of carbolic acid still better. A small amount of chloroform water is sometimes added for the same purpose. The serum may be evaporated *in vacuo* and the dried powder preserved for a long time. When used it should be dissolved in from eight to ten parts of distilled water. In this form it is said to cause more irritation than the fresh serum. Dr. Aronson claims to be able to precipitate the antitoxin from the serum by a saturated solution of sulphate of aluminum. The large precipitate thrown down is redissolved in a one per cent. solution of sodium hydrate and evaporated *in vacuo*. It is claimed that in this form it may be preserved in hot climates. Ordinarily the serum may be kept two or three months without deterioration, but how much longer it may be kept, or how much change takes place after that time, cannot be definitely stated.

Dr. Roux makes two kinds of antitoxic serum—one called the 1-50,000 strength, the other the 1-100,000. These figures mean that one part of antitoxin is enough to overcome a fixed amount of poison sufficient to prove fatal to 50,000 or 100,000 parts (in body weight) of the animal poisoned. Thus, if a guinea pig weighing 500 grams is injected with a quantity of pure diphtheria toxin, known to produce death in twenty-four to thirty-six hours, and it requires 0.01 cc. of antitoxin to overcome the poison, it is said that the strength of the antitoxin used is as .01 cc. is to 500 grams, or as 1 is to 50,000. Practically, a number of guinea pigs are inoculated with the same amount of toxin, and at the same time or before, receive different amounts of antitoxin. The smallest amount of antitoxin which prevents toxic symptoms determines the strength of the serum.

Professor Behring has prepared the serum in three degrees of strength, No. 1 (1-600), No. 2 (1-1000), and No. 3 (1-1500). The dose of Roux's weaker serum is 15 to 20 cc., while the dose of Behring's No. 2 is 10 cc. It

would therefore seem that Behring's is nearly twice as strong as Roux's. Dr. Aronson prepares antitoxin after the method of Behring, for which he claims much greater strength. There is a wordy controversy going on between the two in regard to the merits of their respective preparations, but this does not change the fact that both manufactures are excellent.

Experience has demonstrated that the 1-50,000 strength of Roux or the No. 2 of Behring is the one most frequently required and most easily used. The stronger preparation is only employed in very severe cases or in those that are well advanced before treatment is commenced. The weakest solution of Behring is intended for purposes of protection only.

The mode of administration is by subcutaneous hypodermic injections and is very simple. Dr. Martin, in a lecture delivered to the physicians of Paris, October 14, 1894, gave a very detailed account of the French method of the administration of serum antitoxin. He prefers a syringe, the barrel of which is composed of glass and metal, separated, where they would touch each other, by rubber washers. The piston should be of rubber, and between the syringe and the needle, which is four or five cm. in length, he inserts ten cm. of rubber drainage tubing. Just before use the syringe should be sterilized by being plunged in water at the boiling point and kept there for five minutes. When cool it is filled with the required amount of serum, and the barrel of the syringe is held between the last three fingers and the palm of the right hand, while the needle is grasped near its base with the thumb and forefinger of the same hand. With the left hand a fold of the skin, which has been thoroughly rubbed with some antiseptic solution (bichloride of mercury 1-1000), is pinched up and the needle inserted at its base, care being taken not to penetrate the subcutaneous cellular tissue. When the needle is inserted it is allowed to take care of itself, the flexible rubber tube relieving any strain due to the motions of the patient or operator, and the syringe is taken in the left hand, while,

with the right, the piston is slowly pushed home with a rotary motion. When the needle is withdrawn the orifice is covered with a small piece of absorbent cotton, which, with the serum which exudes, proves a very effective dressing.

In Germany an ordinary large syringe or a Koch syringe is used after the usual manner of hypodermic injections in which careful antiseptic precautions are observed. Aronson advises the use of a syringe made of asbestos and linoleum holding just 20 cc., which is sterilized by boiling and treating with a five per cent. solution of trikresol. Many syringes having special points of value are in the market, but any syringe which admits of easy sterilization, which holds at least 20 cc. and has a needle of large caliber, seems to be all that is necessary. A large needle is of decided advantage from the fact that the serum is often thick and glutinous.

The site of the injection does not seem to make much difference in the action of the serum. By some the interscapular region is preferred. Others select the flanks; because in that location there is less interference with the swelling which follows. Still others inject in the buttocks or thighs. It is customary, when large injections of 40 cc. or more are necessary, to divide the injection in two or more parts and insert them in different places. Dr. Fisher objects to this in that it is unscientific and gives the patient needless pain.

At the point of injection a slight œdematous swelling appears, which subsides in from ten minutes to half an hour. Drs. Aronson, Baginsky, and others advise strongly against the use of massage to disseminate the serum after injection, as it is unnecessary (the serum being quickly absorbed), and is apt to cause irritation and soreness afterward.

The dose of antitoxin varies with the preparation used, the age of the patient, the severity of the disease, and the time elapsed before treatment is commenced. In ordinary cases the dose of Roux's antitoxin is from 15-20 cc., and

of Behring's No. 2, 10 cc. If the case is very grave or treatment has been delayed, the 1-100,000 of Roux or the No. 3 (1-1500) of Behring, in doses of 10 cc. or more, according to the severity, or the 1-50,000 and the No. 2 (1-1000) may be used in doses of 40 cc., 60 cc., or more.

If the patient is over fifteen years of age, the amount of serum used should be almost, if not quite doubled, and if the patient is unusually large the dose should be increased accordingly. The necessity for a second dose and its size depend upon the effect produced by the first. If the patient improves rapidly, as shown by the temperature, pulse, and general appearance, no further injection may be needed. If, however, the condition of the child continues unchanged, a second injection should be given. If the symptoms increase in severity, the injection should be doubled or trebled and repeated daily until improvement sets in. In general it may be said that the repetition of the injection and the amount should be governed by the condition of the patient after each injection, as manifested by temperature, pulse, respiration, and general appearance.

Since there is no reaction following the injection of anti-toxin in the healthy person, it is customary to inject every suspected case, and if, afterward, bacteriological examination shows no diphtheria no harm is done; while, if it is proven to be diphtheria, much valuable time is saved.

For immunizing purposes to prevent the spread of diphtheria Dr. Roux uses his weaker solution in doses of 5 cc. in children under ten years, and 10 cc. in children over that age. Without published statistics, he reports that the results have shown that an epidemic might easily be averted in this way; for the children so treated, after exposure to infection, were either entirely protected, or, if the disease were contracted, the attack was very much mitigated. The protective action is not very lasting, as it probably does not continue longer than six weeks. In Germany the No. 1, or immunizing solution of Behring, or the serum of corresponding strength prepared by Aronson, is used in doses

of 2 to 10 cc. Reports from the Berlin hospitals show that among 130 children exposed to diphtheria, and inoculated with the immunizing serum, only two contracted the disease, which was of a very mild type.

It is said by those who have used antitoxin that the first beneficial effect noticed is in a gradual decline in the temperature. In uncomplicated cases this fall of temperature begins usually within twenty-four hours after the injection, and continues until convalescence is established. In some cases there is apt to be a rise of 1° C., or more, immediately after the serum is used. In a few hours it falls quite rapidly to the point at which it stood before the injection, or perhaps a little lower, and then gradually subsides or varies in accordance with the progress of the case or the complications which may arise. This sudden rise may be partly or wholly due to the excitement of removal to the hospital and the subsequent examination. The pulse and respiration usually follow quite closely the line of the temperature—at least no marked variation has been observed.

The false membrane turns lighter colored and grows thinner. In two or three days it becomes detached and leaves an ulcerating surface, which heals readily. Sometimes there is an increase in the membrane for the first twenty-four hours, but this is not usual. There is very little tendency to spreading, and involvement of the larynx is rare when the serum has been used in time; and post-diphtheritic paralysis is seldom seen.

One of the most marked effects of antitoxin is the improvement in the general appearance of the patient and cheerful mental state. I have noticed this particularly in one patient, in whom the type of disease was very severe, and death eventually occurred from toxæmia. The appetite returns quickly and renders the proper nourishment of the child more easy.

Either soon after the injection or during convalescence an eruption appears on the skin, which has been variously described as an erythema, an urticaria, or as resembling the

eruption of measles. It is sometimes accompanied by a rise in temperature, which soon disappears. It has been seen in comparatively few cases, and usually lasts only a few hours, or at most a day or two. Its principal location is about the joints.

The local symptoms are usually confined to a slight œdema, which disappears quickly. One case was reported where an abscess formed at the point of injection, which healed rapidly after evacuation, and may have been caused by careless antiseptic precautions.

One case of severe nephritis has been reported, but, as a rule, it is said that the kidney complications are less severe than under the ordinary treatment.

The effect of antitoxin being proven on animals, it was thought proper to try it on the human subject as soon as it could be prepared in sufficient quantities, and investigations were inaugurated in various hospitals of Germany and France. In a paper read before the College of Hygiene in Buda-Pesth, September, 1894, Dr. Roux gives in detail his experience in the use of serum-antitoxin in the *Hôpital des Enfants Malades* in Paris. The authorities gave him permission to treat the cases of diphtheria coming to that hospital with antitoxin. His authority goes no further than the local and internal treatment of the cases; the hygienic care, isolation, surgery, etc., remaining under the charge of the hospital directors. Isolation is practically not attempted; suspected cases being received in the same ward with known cases of diphtheria, while there is no segregation of extremely virulent cases. This tends to explain in some degree the high rate of mortality obtained by Dr. Roux as compared with that in the German hospitals, where elaborate details of isolation and hygiene are carried out.

Dr. Roux is fortunate in having at his command, not only the statistics of the hospital during previous epidemics, but also the statistics of the *Hôpital Trousseau* where the regular treatment was in vogue at the time that serum was being tested in the *Hôpital des Enfants Malades*. This

furnishes a means of comparing the mortality rates during the same epidemic.

The months chosen for experiment by Professor Roux and his colleagues, Drs. Yersin, Martin, and Challou, were those during which the mortality is usually the greatest. The local use of caustic applications of all kinds, and later, bichloride and carbolic acid, were prohibited, so that either no local treatment at all was attempted, or only boric acid solution and dilute Labarraque's solution were permitted. The local use of bichloride of mercury and carbolic acid was found to be detrimental, at least when combined with antitoxin. The cases were not classified according to age, although the majority were said to be under six years. As a matter of routine treatment, when a suspected case was first admitted a culture was taken from the throat and an injection of 15 or 20 cc. of serum given. If the bacteriological examination showed the case to be non-diphtheritic or a mild diphtheria, either no further injections were given, or perhaps one on the following day. If other microbes were found, particularly the streptococcus, the case was considered dangerous and an increased dose of serum was given.

The average mortality in diphtheria at the *Hôpital des Enfants Malades* during the four years ending December 31, 1893, was 51.71 per cent. From February 1, 1894, to July 24, 1894, the number of cases received and treated with the serum was 448, of which 109 died, giving a mortality of 24.33 per cent. At the *Hôpital Trousseau* during the same period 520 patients were treated, with 316 deaths, a mortality of 60 per cent. A comparison of the rate of mortality during the serum treatment with the average rate at the same hospital during the four years previous shows a difference of 27.38 per cent., representing the gain due to the serum treatment. A comparison of the mortality at the *Hôpital des Enfants Malades* with that of the *Hôpital Trousseau* during the same period shows a difference of 35.67 per cent. in favor of serum-therapeutics.

Bacteriological examinations showed that of the 448

patients admitted 128 did not have diphtheria, and 20 others were moribund when received at the hospital. Deducting these cases there remain 300 patients treated, of which number 78 died, a mortality of 26 per cent.

A critical examination of these statistics by Dr. Roux shows that in 120 cases in which the diphtheria bacilli were unaccompanied by other microbes, 9 died, or 7.5 per cent. Seven of the 9 deaths occurred within twenty-four hours after their admission, one was suffering from tuberculous peritonitis and the other from a very severe form of measles. In 35 cases streptococci were also found, and of these 12 died, giving a mortality of 34.28 per cent. Similar cases treated by other methods show a mortality of 87 per cent. In 10 cases in which the larynx was involved but where tracheotomy was not performed, there was only 1 death. In this case streptococci were also found accompanying the diphtheria bacilli. In 121 cases in which tracheotomy was performed there were 56 deaths or 46.28 per cent. Fourteen of these cases died within twenty-four hours after their admission to the hospital. Eliminating these there remain 107 cases treated, with 42 deaths, a mortality of 39.25 per cent. This must be compared with 87 per cent. in cases treated by the regular method.

Dr. Roux deduces from these statistics the positive success of antitoxin, used as a protective agent. The enormous reductions of the death rate shown under poor, if not bad hygienic conditions, prove the great value of the new remedy, which under better surroundings may, and probably will, work still greater reforms. The early treatment of the case is of the utmost importance. Dr. Kossel goes a step further, and states that if the treatment is instituted sufficiently early, and enough serum is used, no case of diphtheria should prove fatal. Dr. Roux also notes that the presence of streptococcus greatly complicates the case, and renders the chances of recovery much more uncertain. In this view the German physicians find reason to concur, while a series of experiments with antitoxin in a London hospital, in which bacteriological examinations were made,

showed that the presence of streptococcus had very little influence upon the virulence of the disease.

If the toxic albuminoids produced by the other bacteria present in diphtheria have an influence upon the blood-poisoning character of the disease—and there is every reason to suppose that they do—the scientifically correct antitoxin should be the one which is prepared to combat all of the toxic products of diphtheria as well as those of the bacillus which is supposed to be characteristic of the disease. If in the preparation of antitoxin the toxins of all the bacterial elements present are used, and an antitoxin produced which has the power of antidoting the effects of all, we would then have a remedy which would attack the disease as a whole, and which, if there is any truth in the theory of serum-therapy, should prove a specific for the disease; granting that such a thing as a specific exists.

The experiments above referred to were reported in a paper read before the Clinical Society of London by Drs. Washburn, Goodall, and Card. Two successive series were treated at the Eastern Hospital, each consisting of seventy-two cases; the first series being treated in the usual way, while in the second antitoxin was used. The death rate in the first series was 38.8 per cent., while in the second series the bacillus diphtheriæ was found in only sixty-one cases, and of these thirteen died; giving a mortality of 21.3 per cent. A classification of the second series shows that there were thirty cases of simple angina (that is, without the presence of other bacteria) with nine deaths or 26.6 per cent. The streptococcus was found associated with the diphtheria bacillus in eleven cases, of which one died; giving a death-rate of nine per cent. Out of nine tracheotomies, three died, or 33.3 per cent.

A comparison of these results with those of Dr. Roux shows some rather remarkable differences; for instance, in pure anginas his death rate was only 7.5 per cent. while in London it was 26.6 per cent., which may be partly explained by the smaller number of cases. In associated

streptococcus, Dr. Roux found a mortality of 34.2 per cent., and the London hospital 9 per cent.

The results obtained in the hospitals of Berlin are much better than those of Dr. Roux in Paris. This is undoubtedly due in part to the fact that patients are admitted earlier and time is thereby gained in initiating the treatment. The methods of isolation are also better. All suspected cases are taken into the receiving ward, and unless a physical examination proves beyond a doubt that the disease is diphtheria the patient is kept there to await the result of the bacteriological examination. In this way very few cases other than diphtheria get into the infected wards. The malignant cases are secluded in a room by themselves, and two or three classifications of cases, according to severity, are maintained in separate wards.

In the Children's Hospital of Berlin Professor Baginsky treated 192 cases of diphtheria as shown by bacteriological examination. Nearly all were less than six years, a few being between seven and eight. The mortality was fourteen per cent. Twenty-three of the cases which died were moribund when admitted; deducting these, the rate of mortality is reduced to 11.2 per cent. During the previous three years the death rate in diphtheria in this hospital has varied between 32.5 per cent. and 41.7 per cent.

In the Kaiser u. Kaiserin Friedrich Hospital in Berlin, Dr. Katz treated 128 severe cases of diphtheria, with a mortality of 13.5.

Strahlman reports forty-eight cases with three deaths. These cases were unselected. He also tried the immunizing serum and found it effective for from five to ten weeks.

Rinne reports thirty-four unselected cases of diphtheria in a severe form, with six deaths, a mortality of 17.9 per cent. The deaths were all tracheotomies.

Korte treated sixty unselected cases with antitoxin, the general mortality being twenty-three per cent; fourteen cases were light with no deaths; thirty were severe with fifty per cent. mortality, and sixteen were quite severe with

nineteen per cent. mortality; twenty were tracheotomies, of which fifty-five per cent. died.

Many results of the use of antitoxin in private practice have been reported, but they are not as yet in sufficient numbers to give positive evidence either for or against the treatment.

At the Willard Parker Hospital in this city twenty selected cases were treated, during the latter part of July and the two following months, with "antitoxin Schering." These patients were of the average age of three years, and were all cases in which an unfavorable prognosis would have been given. They had no other treatment save that each was irrigated once on admission with a normal salt solution, and in two cases several irrigations were required to remove the membrane from completely plugged nostrils. The average mortality in this hospital during the past two years among patients under five years has been 42.7 per cent. The average for three years in cases between five and sixteen was 15.8 per cent. and in 188 cases over sixteen years of age the mortality was less than three per cent. Of this series fourteen were laryngeal cases, four were intubated, and one tracheotomized. One intubation case died on the twenty-fourth day of lobar pneumonia, and the tracheotomy case died on the thirty-fourth day of broncho-pneumonia, the result of a cold. Of the cases not operated upon two died: one from sudden heart failure, the other of pneumonia twenty days after all signs of diphtheria had disappeared. Of the six cases in which there were no laryngeal complications one died of scarlatina, which developed during convalescence. The rate of mortality in the laryngeal was 28.5 per cent. against over fifty per cent., and in the other cases 16.6 per cent. The general average of mortality was twenty-five per cent., which is to be compared with 42.7 per cent.

In Paris, since the use of antitoxic serum, the mortality has been reduced to 26 per cent., making a difference of 26.7 per cent. in favor of antitoxin. In Berlin the mortality during the use of serum was 14 per cent., showing a

reduction, when compared with previous years, of from 18.5 per cent. to 27.7 per cent. In New York the diminution in the death rate due to antitoxin was 17.7 per cent., but it must be remembered that the patients were all under five years of age, and were all cases selected for their malignancy. This is probably the most rigid test to which antitoxin has been subjected. A comparison of the statistics of the French hospitals and the Willard Parker Hospital, prior to the use of serum, shows a difference of 22 per cent. in favor of the latter hospital. This is almost as much of a reduction as has followed the use of serum antitoxin, and is due entirely to the different methods of treatment in vogue. At the Willard Parker Hospital an outline of the treatment used is as follows: "1. Absolute rest in bed in a recumbent position. 2. Fluid diet. 3. The room kept at an even and rather high temperature (75° – 80° F.). 4. Thorough, frequent, and complete washing of the nasal and throat cavities with a normal salt solution. 5. Tincture of the chloride of iron in large doses. 6. Stimulation and catharsis as indicated" (*Medical Record*, November 17, 1894). In laryngeal cases, calomel sublimations and moist heat externally were depended upon. In the French hospitals the usual stringent methods, both local and internal, were practiced. The statistics of all cases of diphtheria treated in the past two years by this method gives a mortality of between 28 and 29 per cent., while in the *Hôpital des Enfants Malades* it was 51.71 per cent. This shows that a comparatively mild treatment is alone able to lower the mortality rate by at least 22 per cent.

In Europe Dr. Roux was enabled by the use of antitoxic serum to bring down the death rate from 51.71 per cent. to 26 per cent., while Professor Baginsky did still better in reducing the mortality from 41.7 per cent. to 14 per cent. In other words, Professor Baginsky cut down Dr. Roux's figures by nearly one-half, and this is attributed to the fact that Professor Baginsky's patients received earlier treatment, better hygienic care, and more careful isolation. The deduction which naturally follows is that the substi-

tution of antitoxin for the regular treatment has reduced the death rate due to diphtheria more than one-half, and that the mortality can be again lowered by nearly one-half by early treatment, careful nursing, and isolation.

The results so far obtained are certainly remarkable, and the public is to be congratulated that a great many children, who under the usual treatment would have died, may now be saved. But the question arises as to how much is due to antitoxin *per se*, and how much to the fact that nearly all local and internal treatment was stopped at the time antitoxin was used. The only way to answer this question with any degree of accuracy would be to treat two series of cases, one without medicine, but with the best hygiene, nursing, and isolation; the other with antitoxin as the only medicinal agent and the same hygiene, etc. Such an experiment would show just what value pertains to antitoxin in the treatment of diphtheria, while the results so far obtained show only the value of antitoxin as contrasted with the scientific methods heretofore practiced. A partial answer to the question may, however, be obtained from the reports of the Willard Parker Hospital, where during the past two years, as noted above, the local treatment has been of the simplest kind and the internal treatment comparatively mild. The statistics show that under this treatment the mortality was only 28-29 per cent., which is to be compared with 51.71 per cent. at the *Hôpital des Enfants Malades*, and 64.5 per cent. in the *Hôpital Trousseau*. It is claimed that this difference is due to the method of treatment practiced at the former hospital. This method is a negative one, and consists in dropping stringent local measures and substituting for them irrigations with normal salt solutions. This shows quite conclusively that, by discarding local treatment, the death rate can be reduced at least 50 per cent.

Reports from the Rochester Homeopathic Hospital, received through the kindness of Drs. Lee and Page, show that of 41 patients treated there, the diagnosis being verified by microscopical examinations, there were five deaths, and

of these, three were moribund when admitted to the hospital, and died within twenty-four hours. These figures give a mortality, including all deaths, of 12.1 per cent.

Bearing in mind these results, we are forced to the conclusion that the curative effects claimed for antitoxin are due in a large degree, not to antitoxin itself, but to the partial or complete abandonment for the time of all other treatment, and that as good results by other modes of treatment have been, and can be obtained, as with antitoxin.

At a recent meeting of the Berlin Medical Society Dr. Hansemann attacked the serum treatment of diphtheria, both as regards its scientific and its clinical value. He claims that the Loeffler bacillus is found in healthy throats as well as in mild cases of diphtheria, while the sore throat associated with streptococcus is sometimes severe and dangerous. He says that the Loeffler bacillus appears constantly in rhinitis fibrosa without causing diphtheria, and its rapid multiplication in diphtheria does not influence the course of the disease. He asserts that the disease against which immunity is sought is not diphtheria, but the Loeffler bacillus disease, and that epidemic diphtheria is never seen in animals. In regard to its harmlessness he quotes a case, in which antitoxin was used, that was followed by a kidney affection of a more severe form than has ever been observed after diphtheria. The fact is also noted that the dose has been increased from sixty to a hundred and fifty unities, and the deduction is drawn that, in so far as its immunizing power is concerned, antitoxin is a failure. Dr. Hansemann's criticism comes with more force owing to the fact that he is the assistant of Professor Virchow, and probably voices his views on the subject.

The only way in which the antitoxin treatment of diphtheria, or any other method in the treatment of disease, can be judged is by its clinical results. It makes no difference whether serum-therapy be a scientific method or not, nor

does it matter whether the disease from which it derives its power be diphtheria or the Loeffler bacillus disease ; if it can cure diphtheria in the human subject it has accomplished the desired object and will stand, let the means be what they may. What will be the final result—whether antitoxin will be perpetuated as a monument of therapeutic success, or whether it will be cast aside—time alone will show, and for this decision we must be content to wait.

THE CEREBRAL CENTERS OF VISION AND THE INTRA-CEREBRAL VISUAL NERVOUS APPARATUS.*

BY M. LE DOCTEUR VIALET, PARIS, FRANCE.

THE determination of the cortical center of vision and of the intracerebral tract of the visual conductors offers to the ophthalmologist an interest increasing in proportion as we penetrate each day deeper into the complex relations which unite the eye to the brain, and as we appreciate still more the importance of the reciprocal services ophthalmology and neurology are called to render each other.

Our conceptions of the optic centers and conductors have been completely transformed during a period of fifteen years, and the evolution accomplished in this domain is in close relation with the progress realized in the methods of study of the nervous system. It would be exceeding the narrow limits of this article to point out the different phases of this evolution of which the principal points are given in our late work (Violet, "Les Centres Cérébraux de la Vision," etc.). It will be sufficient to recall, that anatomy and physiology, and the clinic, with the more or less exact control of pathological anatomy, have successively combined to elucidate this question of cerebral localization.

We hope to show, in the explanations which follow, all the importance of the anatomo-clinical method, aided by the research of secondary degeneration, and to make plain the singularly exact results to which this method leads in cerebral anatomy. In this relation it leaves, far behind,

* *Annales d'Oculistique*, tom. cxi. p. 162.

normal macroscopic anatomy, which, valuable in a topographical view, should be added to the researches of pathological anatomy.

Thus, as we have said in our anatomical study of the occipital lobe, "the structure of the brain is too complex to be elucidated alone by the anatomical study of its constituent elements. Under an apparent anatomical unity are hidden diverse physiological functions that comparison of clinical and anatomo-pathological facts can alone determine."

If we insist on this point it is because quite lately M. Brissaud attempts to prove, by arguments drawn from macroscopic anatomy, that the cuneus does not make part of the cortical visual zone. The conclusions of this author, in opposition with better observed clinical and anatomo-pathological facts, are resumed in the two following propositions: (1) the cuneus does not possess projection fibers, and if it does possess them they are not intended for vision; (2) The external layer of the sagittal substance is formed of fibers of projection and not of association.

In relation to the first point, permit us to affirm that the cuneus possesses projection fibers the same as the lingual lobe and as the remainder of the occipital lobe; the study of secondary degeneration, in our different cases of circumscribed lesions of the cuneus, has permitted us to follow them from their cortical expansion up to their central gray nuclei. They follow two ways in their spiroid passage around the occipital cornu: one superior, above the ventricle; the other inferior, below the ventricle and bordering on the pulvinar. That these fibers are visual cannot be denied, since their destruction produces a persistent hemianopsia. The research of secondary degeneration also proves that they emanate directly from the ganglionic centers of vision (see observations I., II., III.).

Let us examine now the second proposition of M. Brissaud. We know that around the tapetum, which surrounds the posterior cornu, the white fasciculi of sagittal direction are disposed in two distinct layers, one internal,

the other external. M. Brissaud gives them the names of internal sensitive fasciculus and external sensitive fasciculus, considering them both as composed of projection fibers; still more, he attributes to them especially the functions of general sensibility.

M. Brissaud still comprises under the denomination of sensitive fasciculi a series of sensorial and sensitive fibers that the experimental or anatomo-clinical researches of preceding authors have succeeded in differentiating. The old zone of general sensibility has been divided into two distinct sensorial territories, and it has been demonstrated that if the temporal lobe is intended for audition, it is in the occipital lobe that we must localize the visual functions.

A circumscribed lesion of the cuneus or of the lingual lobe does not give rise to any disturbance of the general sensibility, while it produces a persistent hemianopsia. This clearly establishes the optic sensorial rôle of this cortical territory. If now we prove that the fibers which pass from this territory burrow in the internal zone of the sagittal substance to reach the ganglionic centers of vision, we shall be found correct in saying that this zone contains visual fibers, and in considering them as formed of *optic radiations*. That it does not exclusively contain optic conductors, especially anteriorly, and that it receives numerous fibers from the convexity of the occipital lobe, from the angular gyrus and from the parietal lobe, is incontestable. It is not the less true that in its occipital portion it is particularly composed of visual projection fibers, plainly justifying the name of optic radiation, under which they are known by Monakow, Henschen, etc. According to our teaching, the sagittal substance is divided into two distinct layers. One, the internal (internal sensitive fasciculus of Brissaud), contains the optic conductors, as proven by the progress of degeneration; the other, the external (external sensitive fasciculus of Brissaud), has quite a different rôle, and, although its functions are not absolutely known at present, one can affirm that it is composed in most part of association fibers, since they link the occipital lobe to the tem-

poral lobe. Observation III. gives an undeniable confirmation of this by showing that interruption of the inferior longitudinal fasciculus is translated by a special form of verbal blindness—Dejerme's *pure word-blindness*.

For these reasons, the two layers should not be confused under the old name of a sensitive fasciculus. One is an *optic sensorial fasciculus*, the other an *association fasciculus*.

Before giving the results of our researches, it seems necessary, for perfect comprehension, to give a brief anatomical view of the occipital lobe, both as to its exterior configuration and as to its structure, elucidated by a series of microscopic sections.

All parts of this lobe have not the same importance to us, and if it is probable, as we see it in the sequence of this study, that the different parts play a direct or an indirect rôle, either in the perception of optic impressions or in the elaboration of visual memory, it is a region in which we are especially interested.

To a considerable extent, since it comprises the internal and inferior surfaces of this lobe, it is represented by the cuneus and by the lingual and fusiform lobules.

Two important grooves (Fig. 1) appear in the first months of intra-uterine life, the internal perpendicular fissure and the calcarine, giving the internal surface a special appearance.

These two fissures, the first (*po*) descending obliquely from above downward and from behind forward, the second (*calc*) burrowing horizontally, fuse at their anterior extremity like a letter *Y*, and circumscribe, in this way, a triangular surface, having its apex in front, which is the *cuneus*. This portion of the internal face, always recognized by its geometrical figure (*Cun*), presents some small secondary grooves, the most important of which is parallel to the calcarine fissure. The cuneus seems, at first sight, isolated by the perpendicular and the calcarine fissures, but this is only apparent. They fuse only superficially, and when spread open at their point of meeting there is shown, more deeply, a connecting fold, the cuneo-limbic plia of Broca,

which unites the cuneus to the convolution of the corpus callosum.

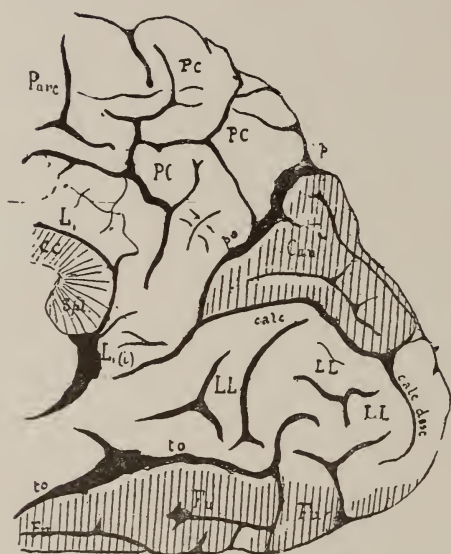


FIG. 1.—Internal face of the occipital lobe, showing the disposition of the cuneus and of the lingual and fusiform lobules. The cuneus and the fusiform lobule are marked by engraved lines (right hemisphere).

Cc, Corpus callosum ;

Cun, Cuneus ;

Fu, Fusiform lobule ;

L, Limbic lobule (convolution of the hippocampus) ;

L (i), Isthmus of the limbic lobule (foot of the hippocampus) ;

LL, Lingual lobule ;

Pare, Paracentral lobule ;

Pc, Precuneus ;

spl, Splenium ;

calc, Calcarine fissure ;

calc. desc, Descending branch of the calcarine ;

po, Occipito-parietal groove ;

to, Collateral groove.

The calcarine fissure above, and the collateral groove below, circumscribe the lingual lobe, thus named on account of its narrow form from before backward. This lobule (*LL*) forms the rounded border by which the internal face is

continuous with the inferior face of the hemisphere. Its upper half makes the integral part of the first, its inferior half belongs to the second; its base responds to the posterior border of the occipital lobe and is backed against the descending portion of the calcarine fissure (*calc.*), while its apex narrows and is inserted on the convolution of the hippocampus.

The remainder of the inferior face is formed by the fusiform lobule (*Fu*) or first temporo-occipital convolution (Broca), comprised between the collateral groove and the third temporal groove. Thus, as the name indicates, the fusiform lobe is much larger in its middle part than at its extremities. Posteriorly it fuses with the third occipital convolution, while in front it is continued, without line of demarcation, with the first temporo-occipital convolution.

The occipital lobe is hollowed by a cavity which is only the occipital prolongation of the lateral ventricle. Between this cavity and the cortex is found the *white substance* of the lobule, an important mass of nerve fibers, of direction, of origin, and of physiological signification widely differing; some, short tracts, connect two contiguous points of the cortex; others, longer tracts, bring into communication the two occipital lobes, with each other, or each with the frontal and temporal lobes; finally,—and this is the point we desire should be well appreciated,—fibers of projection properly so called, or *visual fibers*, which, emanating from the ganglionic centers of vision, radiate in a certain portion of the cortex of the occipital lobe.

If we make, in the posterior half of the brain, a double series of microscopic sections, one in the vertico-transverse direction (Fig. 2), the other in the horizontal (Fig. 3), we can differentiate in the white substance a central part formed by antero-posterior fibers; this is the *sagittal substance*. It is formed of three distinct layers; an internal layer of *callous fibers*, situated immediately under the gray sub-ependymar substance, a middle layer or *visual fibers*, an external layer or fibers of the inferior longitudinal fasciculus. Having a common origin, the occipital cortex,

these fibers immediately disperse to terminate in distant and diverse regions of the brain.

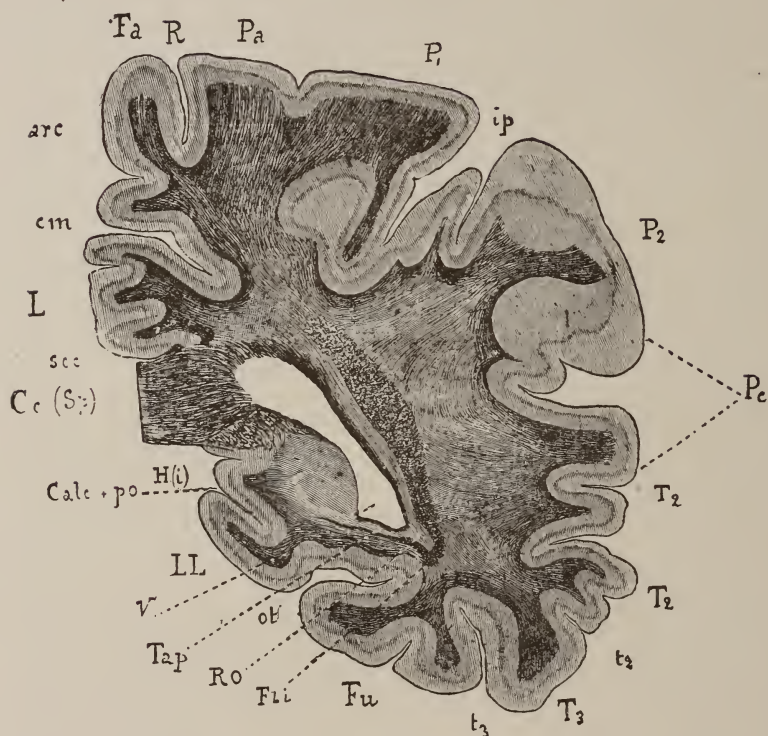


Fig. 2.—Vertico-transverse section at $6\frac{1}{2}$ centimeters from the occipital pole. Fusion of the two forceps. Projection of the corpus callosum (*Co Sp*). The optic radiations (*Ro*) and the fibers of the inferior longitudinal fasciculus (*Fl*), very distinct at the inferior part of the ventricle, blending in the middle part of the section with the different fibers of the white substance.

The *callous fibers* burrow under the ependyma and the gray ependymar substance, forming a tract that continues to the ventricular cavity, a covering called, by older anatomists, the *tapetum*. Scanty on the internal and inferior walls of the ventricle, the callous fibers condense into a compact fasciculus at its upper part; this is the origin of the *forceps*. At its origin the forceps is single, further on it divides into two portions, a smaller lower, the

minor forceps, while the upper part is larger, containing the majority of fibers, and is called the *major forceps*. This division of these fibers is continued, with progressive attenuation, to the neighborhood of the projection of the corpus callosum. The *callous* fibers are inter-hemispheric commissural fibers designed to unite the occipital lobes.

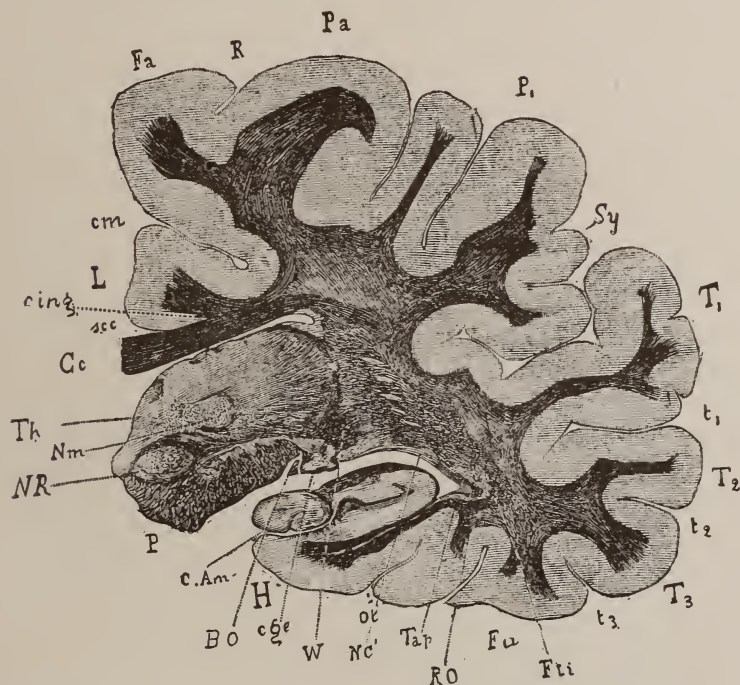


FIG. 3.—Vertico-transverse section at eight centimeters from the occipital pole and passing by the middle part of the optic layer (*Th*) and the external geniculate body (*cge*). This section shows the relations of the optic radiations (*RO*) with the ganglionic centers of vision.

The layer of *optic radiations* is composed of fine fibers that are colored weakly in violet by hematoxylin and in rose by carmine. Thanks to such histological characteristics, these fibers present clearly to the observer under the form of a clear zone bounded externally and internally by a darker zone.

These optic radiations or visual fibers form a complete

ring around the tapetum. The migration of the callous fibers to the internal part of the ventricle soon breaks into regular disposition. The visual fibers, not being able to pass directly to the internal part of the ventricle, turn around it by a spiroid movement which carries them outward and forward. They reunite at the external wall of the posterior cornu, and their layer, growing by a continuous supply of new fibers, increases in thickness up to the ganglionic centers of vision. From this general disposition it results that their layer becomes more and more thin on the internal wall of the ventricle, and disappears a little in front of the projection of the corpus callosum. From here the radiations, much circumscribed in the inferior half of the lobe by internal and external layers, are more and more confused at the external and upper part of the white substance; for one part, with the association fibers of the inferior longitudinal fasciculus, for the other part, with the projection fibers coming from the convexity (Fig. 3).

At the level of the gray central nuclei, the layer of visual fibers, always recognizable at the inferior part of the ventricle, is re-enforced on the external wall of the latter by a great number of radial fasciculi, which are only the projection fibers of the temporal and parietal lobes participating in the formation of the radial crown of the optic layer. The latter fibers decussate with the radiation and their different fasciculi, cutting the visual fasciculi at variable angles, but becoming much more open-meshed as they leave the more anterior regions, giving rise to a grouping of fibers making up the characteristic figure known as Wernicke's *triangular field*.

Let us now examine the optic radiations in a horizontal section (Fig. 4). The ventricle is limited externally by a thick layer of callous fibers, inward by a finer layer of the same fibers, in front by the cornu of Ammon, the fimbria, and the choroid plexus of the lateral ventricle. It is at this point that the optic radiations attain their greatest development, and that we find very clearly the manner

in which they turn to form a large band on the external wall. At the moment of making the turn which leads them to the gray nuclei the radiations receive their contingent of projection fibers from the convexity. Here they spread out on a larger surface, and mingle in a certain measure with the fibers from the inferior longitudinal fasciculus which divides at this part. They finally pass to the posterior part of the internal capsule (*CI*) and break through the reticulated zone to touch the optic layer. At this point the field of Wernicke (*W*) has increased in volume; it increases progressively up to the external geniculate body.

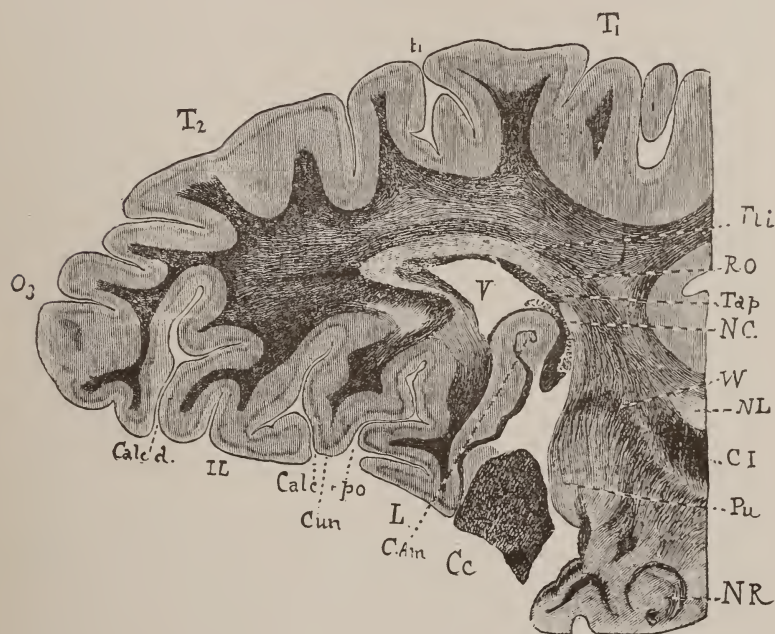


FIG. 4:—Horizontal section passing through the inferior third of the optic layer. Around the ventricle we distinguish the three layers of the tapetum (*Tap*), optic radiations (*Ro*) and the inferior longitudinal fasciculus (*Fl*). The optic radiations project at the level of the pulvinar (*Pu*) into the middle part of the field of Wernicke (*W*).

Constituted in its posterior part of fibers arising exclusively from the occipital layer, the layer of radiations, in

proportion as it approaches the ganglia of the base, is augmented by fibers from the parietal and temporal lobes. Thus enlarged and formed by elements differing both in their origin and in their physiological significance, they contribute to the formation of the posterior part of the internal capsule; then, dissociated in numerous fasciculi, they terminate in the optic layer, and the external and internal geniculate bodies.

The external layers, formed by the fibers of the inferior longitudinal fasciculus, are detached in the form of a dark ribbon (*Fli*), which is marked vividly on the paler tint of the optic radiations inward, and of the decussating fibers of the white substance outward. Its constituent elements have the same origin as those of the preceding layers. They also arise in the occipital cortex, and reach the central part of the white substance. Their large caliber and the fact that they group at once in compact fasciculi permit us to easily distinguish them from the projection fibers and from the callous fibers. While the latter are intimately mingled, the long fibers of association appear in the middle part of the white substance of the occipital part; under the form of a darker zone, with undecided limits that gradually become more and more exact. Leaving the extreme point of the occipital cornu, they turn around the middle zone of the optic radiations and form, from there, a regular and easily recognizable stratum in the whole extent of the occipital lobe. By penetrating into the parietal and temporal lobes, the upper part of the external layer loses its individuality. The elements which compose it decussate above and externally with those of the white substance, internally with those of the optic radiations; the limits of the external zone are consequently effaced more and more, to completely disappear at the central oval.

(To be continued.)

SCOPOLAMINE HYDROBROMATE IN INCREASED INTRA-OCULAR TENSION.

BY F. G. RITCHIE, M. D.

ESERINE and pilocarpine have long held the field against all comers as reducers of eyeball tension, but it looks as if they would, at least, be forced to share the honors with scopolamine.

If it should be conclusively proven that we possess in scopolamine a mydriatic which is capable of reducing tension, the drug will certainly be a valuable accession to the list of those available in the treatment of glaucomatous conditions. The cases that will be cited, and which have been under my observation at the New York Ophthalmic Hospital, certainly present sufficient grounds for believing that the drug in question possesses the property of dilating the pupil, and at the same time of reducing the tension.

That this property is of inestimable value in the treatment of cases of glaucoma complicated with iritis, or in cases of iritis occurring in advanced life, is beyond question. There are but few oculists of wide experience who have not at times found themselves "between Scylla and Charybdis," metaphorically speaking, when they have been confronted on the one hand with a plastic iritis which has threatened to result in an exclusion of the pupil with its attendant evils, unless recourse was had to a mydriatic; and on the other hand, the certainty, born of sad experience, that an increase of tension would result from its use.

CASE I.—I cite this case as it has a direct bearing on the one that is to follow, and not for any proof it offers that

the drug under consideration reduces increased tension, although the results were such that it aroused in my mind the suspicion that such might be the case, and led me to try it at the first opportunity that presented.

J. B., age fifty years, was admitted to the hospital August 11, 1894, under the care of Dr. Deady, suffering from sympathetic irido-cyclitis in the left eye, the right having been enucleated about two weeks previous (as near as I could learn). A four-grain solution of atropine was instilled, the icebag applied, and rhus tox. administered internally. I first saw him on the 19th instant, during the absence of Dr. Deady, and found the tension increased to $+1$. The atropine was replaced by eserine 1-200, and the tension quickly fell to the normal. Not caring to repeat the experiment with atropine, and yet desirous of dilating the pupil if possible, I ordered a 1-200 solution of the hydrobromate of scopolamine, to be instilled every three hours, carefully watching for any increase of tension, which I am pleased to state did not occur. The case progressed favorably under the combined action of scopolamine and rhus tox., and he was discharged October 2 with a vision of $\frac{20}{40}$, which continued to improve, and one week later was found to be $\frac{20}{30}$.

CASE II.—Mrs. M. G., age seventy-five, a patient of Dr. Rounds, was admitted to the hospital September 25, 1894, for treatment of glaucoma simplex of the right eye. The left eye had previously been operated for the same trouble, two iridec-tomies having been made before the tension was controlled. Both lenses were partially cataractous. Vision in the right eye was reduced to fingers at about three feet. Eserine was instilled every two hours, and spigelia administered internally. Gel-semium, and later bryonia, were given between October 2 and 8, but as the vision continued to fail, an iridectomy was performed on the latter date, which was followed by an extensive hemorrhage into the anterior chamber. The tension was not relieved permanently, but rose again on the second day. Eserine was continued locally, and hamamelis, gelsemium, cinnabaris, nux vomica, and chin. mur. were exhibited with no material benefit. On November 3 an iritis having developed, at my suggestion, and after relating the facts in the preceding case, it was decided to try the effect of scopolamine hydrobromate, in the strength of 1-200,

dropped into the eye every three hours. The instillation of the drug was followed by marked improvement, the tension being reduced, the pain ameliorated, and the vision improved. She was discharged on the 12th instant with sufficient sight to enable her to recognize persons at a few feet distant. The patient was seen three months later, at which time the vision was the same, the tension normal, and no signs of irritability of the eye apparent.

CASE III. Miss S. A., age thirty, was admitted to the hospital November 20, 1894, by Dr. Deady, she having had an attack of parenchymatous keratitis involving both eyes, and from which she had about recovered.

On the following day the nurse called attention to œdema of the lower extremities, and a physical examination was made, but no heart lesions or affection of the kidneys were discoverable. She was kept in the supine position and apocynum can. was administered. The œdema disappeared, and on the 23d inst., merc. prot. was given for a pharyngitis which developed. On the following day there was an appreciable increase in the tension of both eyeballs, and eserine 1-200 was prescribed to be dropped into the eyes every three hours, which not only failed to relieve the tension, but caused such smarting and fibrillary twitchings that it was discontinued on December 3.

On November 27 she complained of sticking pains in the eyeballs as from needles, and for this condition sulphur was prescribed, but the œdema of the extremities reappearing on December 1, recourse was again had to apocynum can., which caused the œdema to again disappear. In view of the beneficial effects of scopolamine in the two preceding cases, and also on account of the irritation produced by the eserine, it was decided to substitute scopolamine for that drug, which was done on December 3. The tension remained normal until the use of the drug was discontinued, when it immediately rose again, but on again renewing its use it fell to normal. This condition of affairs obtained up to the time she was discharged (December 18), the tension rising as soon as the use of the drug was suspended, only to fall again to normal upon its being resumed. Between November 27 and this date bryonia and jaborandi were used, as they appeared to be indicated.

On December 22 she called at the hospital in the evening, saying that she had been unable to see Dr. Deady, and implored

me to put a drop in her eye as the vision was dim again, and she was fearful that she would lose the sight, promising to call on Dr. Deady the following day.

She was again admitted to the ward on December 25, and on the 28th inst. had an attack of rheumatism involving the knees and hands, together with a pericarditis, which attack was controlled with natrum salicyl. In addition the following remedies have been used with but temporary benefit: Bryonia, arnica, spigelia, kali. hyd., gelsemium, pulsatilla, merc. prot., kali. bich., and nux vom. The only treatment that seems to control the tension is the local use of scopolamine, and that only while it is used, the tension increasing soon after the drug is discontinued. I will add that the condition of the eyes is improved when the rheumatic symptoms are present, but when they disappear, the eyes become worse. The acuteness of vision has been preserved to an astonishing degree, she being able to read $\frac{2}{80}$ with either eye by the aid of her correcting glasses which are: O. D. + 50 D°, axis 165° — 3.25 D°, axis 75° O. S. + 1.25 D°, axis 180° — 1.50 D°, axis 90°.

A SIMPLE METHOD FOR THE REMOVAL OF SPURS AND RIDGES FROM THE CARTILAGINOUS SEPTUM.

BY CHAS. E. TEETS, M. D.

ON the lower portion of the cartilaginous septum, we frequently notice protuberances which closely resemble the sessile hypertrophies of the mucous membrane. These, when touched with a probe, have a hard, elastic feeling, the same as conveyed to the hand when touching the cartilaginous septum, in other apparently normal portions. They are not localized deviations of the septum; because we do not find a corresponding depression on the opposite side, but are true hypertrophies of the septal cartilage.

Gottstein claims that they are the results of a localized chronic perichondritis. This is, no doubt, true in some cases; in others, however, I believe them to be due to a splitting of the cartilaginous plate, causing this septal plate to bulge out on one side or the other, and, in some cases, on both. The splitting is due to a blow directly upon the nose, or is the result of a hæmatoma or abscess. These protuberances are considered by some as tumors; but, as they are not true neoplasms but only localized increase of the normal tissues, they can be considered only as true hypertrophies of the cartilages. The symptoms to which these protuberances give rise are so well known, especially by those who give much attention to the treatment of diseases of the nasal cavities, that it is hardly necessary to allude to them here. I will, however, merely for the sake of completeness, say a few words in regard to them, calling attention to those most important.

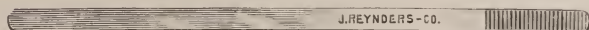
The most prominent, and to the patient the most annoying symptoms, are the neuralgic pains, and almost constant irritation of the mucous membrane covering the swelling. Lenox Brown contends that the most sensitive points in the nose are found to be over spurs and ridges situated near the anterior parts of the septum. These spurs and ridges, coming in contact with the turbinated bodies, or pressing against the outer wall, excite various other nervous symptoms, which, being remote from their cause, are frequently either entirely overlooked or are regarded as manifestations of a different disease.

This redundancy of tissue in the nose should be removed in a manner which accomplishes the object thoroughly; at the same time giving the patient the least discomfort from pain and hemorrhage. The application of caustics such as chromic acid, nitric acid, and trichloroacetic acid, with a view to destroying cartilaginous hypertrophies, is useless. They cause great pain, which lasts a long time; and, as the action of these agents cannot always be controlled, they are apt to occasion serious general inflammation of the mucous membrane lining the nasal cavities. Certainly, no experienced rhinologist would treat these growths in such a manner. They may be removed with the saw or knife; but, when not too large, a simpler method for their removal is by the galvano-cautery.

Patients frequently shrink from the cutting instruments; but I rarely have one object to the removal of these growths by the galvano-cautery. When a properly constructed nasal speculum is used, and the cocaine applied to the parts to be operated upon in a manner which I will hereafter describe, the operation is not only free from pain, but also from hemorrhage. I found by experience that the specula in use were not suitable for cautery-work, so I had made, by Reynders & Co. of New York, a speculum specially adapted to galvano-cautery operations. I am indebted to this firm for their skillful manner of carrying out my ideas.

This speculum is a modification of Miles. It has on each

side a steel plate, which slides in grooves ; the object being that the opposite side, or the parts of the mucous membrane not to be operated upon, may be protected. At the top is a triple-thread adjustment screw, which not only

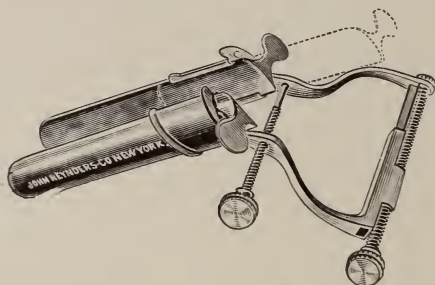


makes the speculum self-retaining, but causes it to act as a dilator. Attached to the arms, and near the jaws of the speculum, is a small screw which further strengthens it when used for dilation. This may be removed, if desired. Where there is much cauterization in the nose, especially with nervous patients, there is no other speculum so well adapted to the purpose, and I claim that it is impossible, with the ordinary speculum in use, at all times to avoid burning the opposite side. This is especially so with children. I know it is contended by some, that such a speculum is not needed, and that those now in use answer all necessary purposes. Notwithstanding this, a prominent specialist has acknowledged and recorded that, in destroying a growth upon one of the turbinated bones with the cautery, he also by accident burned the opposite part of the septum nasi. This nearly resulted in permanent agglutination of the nasal passage. I have several times been consulted by patients who had previously been treated with the galvano-cautery, where this was the result.

I am convinced that the average practitioner, in attempting to destroy abnormal tissue in the nose with galvano-cautery or acid, often touches other parts of the mucous membrane ; and the adjacent surfaces in these cases frequently become firmly adherent ; thus more harm than good results. Before commencing the operation, the parts should be thoroughly anæsthetized ; so that all pain to the patient may be avoided. This is best accomplished by saturating a strip of lintine, about half an inch wide, with a ten to twenty per cent. solution of cocaine.

This lintine is passed into the side to be operated upon,

by means of my flat applicator, which was also manufactured by Reynders & Co., and is made to cover the tissue to be removed.



The next step is, to place the speculum in such a position that the sliding plates cover the parts to be protected. The electrode is then passed into the speculum; the platinum loop, however, should not be heated before introduction. Let the knife be at a cherry heat when applied to the growth, then there will be neither hemorrhage nor pain, but, if the heat be too great, considerable bleeding follows the application; also, if the knife be not hot enough, the pain is severe. After holding it in contact with the growth for about two seconds, it should be drawn to the opposite side while still at a cherry heat, so as not to pull off the eschar, and at the same time burning off the tissue adhering to the knife, the application to be repeated until the growth is removed. I do not agree with Seiler that extensive burns of the mucous membrane are often followed by severe inflammation. Such results are due to improper after-treatment. It is on proper attention to this after-treatment that the success of galvano-cautery operations depends. The patient should be seen and treated every other day, for one week. Afterward twice a week, until the healing process is completed. Benzoin, to which calendula and eucalyptol have been added, makes a good application after these cauterizations. It is not only soothing to the mucous surface, but protects the membrane from atmospheric influences.

THE OPERATION FOR CATARACT.

BY CHARLES DEADY, M. D.

THE relative merits of the simple operation for cataract, as compared with that accompanied or preceded by an iridectomy, have been the subject of a prolonged and spirited controversy among the prominent ophthalmic surgeons of the world. The advocates of the former method extol its simplicity, its increased visual possibilities, and its great desirability as a cosmetic procedure, while its opponents contend that the danger of prolapse of the iris, the difficulty of expulsion of the cortical substance, and the consequent tendency to inflammatory complications, together with the greater amount of manual dexterity required, more than offset its acknowledged advantages.

In this country Knapp was the first operator to make extensive use of the simple method, and in his first report of twenty-nine operations,* he makes the following comparison of its advantages and disadvantages:

“If we compare the simple extraction with the extraction *combined with iridectomy*, we find as ADVANTAGES of the former the following :

“1. It preserves the natural appearance of the eye.

“2. The acuteness of vision, other things being equal, is greater.

“3. Eccentric vision and ‘orientation’ are much better, adding a great deal to the comfort and safety of the patient.

“4. Parts in direct connection with the ciliary body, such as shreds of the capsule and iris, are not so liable to be locked up

* *Archives of Ophthalmology*, vol. xvi. No. 1.

in the wound and thus transmit morbid conditions to the most vulnerable part of the eye, the ciliary body.

"5. It may not necessitate so many after-operations."

As DISADVANTAGES he mentions:

"1. The technique of the operation is more difficult in all its parts: (a) The section must be larger, to let the lens pass through an aperture, the size of which is diminished by the iris lying in it; it must be more accurate to secure coaptation, and it must be more rapidly performed in order to prevent the iris from falling before the knife. (b) The opening of the capsule requires a deeper introduction of the cystitome into the anterior chamber. (c) The expulsion of the lens is more difficult, and (d) the cleansing of the pupillary area is much more troublesome than in the combined extraction.

"2. Prolapse of iris and posterior synechiæ are more numerous.

"3. It requires a quieter and more manageable patient during and after the operation, than is needed in the combined extraction.

"4. It is not applicable to all patients, whereas combined extraction can be used as a general method."

In this series he reports "Eighteen perfect or ideal recoveries among twenty-nine cases—*i. e.*, sixty-six per cent."—with loss of one eye.

In the second article * he reports his first one hundred cases (including the before-mentioned twenty-nine) with ninety-six per cent. of good results, three per cent. of moderate results, and one per cent. of failures, showing the improvement in technique obtained by practice; but in this report he makes the statement that

"In spite of this remarkable freedom from inflammation, the *pupillary area has not been so unobstructed as I anticipated* [*Italics his*]. As a rule the center of the capsule had been freely ruptured, yet only rarely did the pupil become clear enough to render a subsequent dissection useless."

In this series, prolapse of the iris occurred twelve times

* *Archives of Ophthalmology*, vol. xvii. p. 51.

and iritis twenty times. In his third report,* detailing the results of another series of 100 cases, he gives 96 per cent. ranging from $\frac{20}{20}$ to $\frac{20}{200}$, 3 per cent. from $\frac{15}{200}$ to $\frac{5}{200}$, and 1 per cent. movements of the hand. In this article he notes some changes in the technique of the operation; whereas formerly his section coincided with the transparent margin of the cornea, he now advises that it be made less peripheric, on the ground that the danger of prolapse and incarceration of the iris is thereby lessened. He also renounces his former method of opening the capsule in the center, in favor of the peripheral opening made by passing the cystitome under the upper part of the iris, claiming fewer posterior synechiæ as a result of the change.

In this series a secondary operation was made in fifty-three cases, and he states that "the average visual result of extraction is $\frac{20}{30}$, which, by subsequent cystotomy, is converted into $\frac{20}{30}$." In concluding his review of the cases he states that

"Simple extraction is not only the best but also the safest method of removing cataract."

This showing certainly speaks volumes for the simple operation, but, unfortunately, we are not all of us Knapps, and, without doubt, great weight must be given to the wonderful skill and great experience of the operator, in considering these cases. There can be little question that the operation requires greater facility on the part of the surgeon and more care in its performance, and that with the average operator it is only adapted to selected cases, as many of its advocates claim that its use should be restricted to patients in whom all the conditions are favorable; that is, where the lens is properly ripened, the eye free from any disease liable to complicate the operation, general health good, and the patient quiet and tractable.

Many eminent ophthalmic surgeons, in all parts of the world, doubt the advisability of its use under any circum-

* *Archives of Ophthalmology*, vol. xix. p. 280.

stances, claiming that the combined operation, and more particularly that in which a preliminary iridectomy is made, is preferable, because of less liability to accident. A number of them, who, attracted by the brilliancy of the new method, have given it a fair trial, have later returned to the old procedure, as promising greater safety to the patient. One of the claims made by the advocates of the new operation, viz., that other things being equal, it results in better visual acuity, is disproved by many reports from competent men, showing no difference in the average vision obtained in either operation, and this after thorough trial in many cases. That its cosmetic effect is desirable, goes without saying, but that its advantages in this respect are commensurate with the additional risk sustained under the hands of any but the most skillful operators, is exceedingly doubtful. That the degree of traumatism as compared with the combined operation is reduced, is true, but under rigid antiseptis this factor becomes of less importance; and where a preliminary iridectomy is made, it does not enter into the case. The claim of greater rapidity in the performance of the operation is also nullified by a previous iridectomy, and in any case should have but little weight. In this connection mention may be made of Trousseau's modification, which, while only adapted to the most skillful manipulation, is more rapid and freer from the dangers of infection and traumatism than the simple operation as ordinarily made. The only instrument he uses is the Graefe knife, although he advises that the usual complement be at hand in case of need. The lids are held open by the thumb and forefinger, in such a manner as, at the same time, to fix the globe. The section is upward. Having the patient look downward, and holding the eye in this position, he makes his puncture in the scleral-corneal margin; then turning the point of the knife downward, he tears the capsule and finally makes the counter-puncture. The flap is made a little larger than the upper third of the cornea, the section being terminated at the upper scleral-corneal border. When the capsule is thick and difficult to tear he transfixes

it, and making the counter puncture cuts the capsule at the same time as the cornea.

Before finishing the section, he releases the lower lid, still holding the upper; and terminates the section very slowly, to avoid the sudden expulsion of the lens and possible loss of vitreous. After cutting the flap, he uses the back of the knife on the lower part of the cornea, as a spoon to assist in the exit of the lens, making pressure on the upper border of the wound, if necessary. He follows the lens closely with the back of the knife, and so removes the cortical substance. He uses no eserine and makes no iridectomy. He claims a minimum of bruising from the rapidity of the operation, decreased liability to infection because only one instrument is introduced into the eye, fewer cases of loss of vitreous, as the eye is controlled by the fingers and the pressure can be instantly removed, if necessary; that a sudden movement of the patient is not so dangerous for the same reason, and that the danger of prolapsed iris is much reduced as the eye is not pressed upon by the speculum and keeps its normal shape, and the iris is consequently less apt to be drawn into the wound.

The disadvantages of the operation are, that it is impossible in any but docile patients, that aqueous may be lost in changing the direction of the knife to reach the capsule, that in soft cataract the lens substance may fill the anterior chamber and obstruct the view, and that in case of a sclerosed lens the zonule may be torn and luxation result, although he claims that he has had none of these accidents. A few other surgeons now perform the operation in substantially the same way, but Trousseau claims originality and presents excellent statistics in over seven hundred cases. The operation, it will be seen, requires great manual dexterity.

Granting the claims of rapidity of execution and simplicity, and admitting the desirability of a natural pupil, the question of safety should, after all, be the deciding factor in all surgical procedures. Cataract operations are made to give the patient vision, and that method which

most certainly conserves this object, and with the least possible risk, will ever be the choice of the careful surgeon. In an analysis of a series of over four hundred cataract extractions with iridectomy, performed by Professor Haab of Zürich, and collected by Dr. Theodor Arnold,* in which, by the way, nearly ninety-nine per cent. of the cases were successful, vision varying from one to one-tenth per cent. of poor results, and only about one-third of one per cent. losses, the writer sums up the matter with the statement: "*That simple extraction is not the best, nor is it the safest method of extracting cataracts; on the contrary, the combined extraction, when thorough antiseptic methods are rigorously enforced, shows fewer total losses and a relatively better amount of sight than the simple extraction.*"

The following opinions of prominent operators are taken from an article on the subject by Dr. Landolt:†

"I consider iridectomy as indispensable to assure the lasting success of a cataract extraction. According to the cases of extraction, without iridectomy, from my statistics, and according to those I have seen, from those of my colleagues, I believe that extraction without iridectomy disposes not only to secondary cataract but also to chronic irido-choroiditis, two affections which gravely hurt the final result of the extraction."—Eperon.

"I maintain the doing of iridectomy in all cases."—Von Hippel.

"I greatly favor the combination of iridectomy with extraction."—Argyll-Robertson.

"I uphold the performance of iridectomy, because it facilitates the expulsion of cortical masses and because I regard as a step backward—indeed, often even a danger—the severe regime that simple extraction imposes upon the patient."—Manz.

"The cataract extraction, with iridectomy, is the safest."—Fuchs.

"Iridectomy makes it very easy to extract the capsule, and when one does not succeed in extracting the pieces of the capsule iridectomy permits the making of a very extended and very

* *Archives of Ophthalmology*, vol xxii. No. 4, page 462.

† *Ophthalmic Record*, vol. ii. Nos. 4 and 5.

exact dissection. It permits, moreover, the watching of the expulsion of cortical masses."—Tacke.

"Besides the greater protection it offers against impactions of the iris, I consider iridectomy very useful because it facilitates the absolute clearing up of the pupillary field, and consequently prevents the formation of secondary cataract. In 130 extractions I performed at most four dissections."—Neese.

"Iridectomy is very favorable to prompt and complete expulsion of cataract, and also to prevent or mitigate the dangers of inflammatory processes, which often follow the best performed operation."—De Vincentiis.

"In five hundred operations done consecutively, with iridectomy, I have had to deal with prolapse of the iris only once."—Tacke.

"I do not understand the colleagues who, with reference to cosmetic effect, make so much of a round pupil. Since I have been in practice no patient has ever asked me to so operate on him as to keep a round pupil. The patient desires to *regain sight*, whether it be with a round pupil or with one having the form of a keyhole ; that is all one to him, and to me, as a practical oculist."—Steffan.

"I always perform a narrow iridectomy above, because it protects most from iris prolapse, while it causes no disfigurement nor lowering of vision, nor does it affect the power of orientation nor the mobility of the pupil."—Swanzy.

"Impactions of the iris, irites, and irido-choroidites, pupillary occlusion, and secondary cataract are, especially, much more frequent under *simple* extraction. This method requires, moreover, a tranquillity of which many patients are incapable, and which, for a great number, is a serious motive for fearing the cataract operation."—Manoleson.

"Led by my experience, I have reached the conclusion that the advantages of an operation without iridectomy cannot compensate those of an operation with iridectomy."—Des Jardins.

"I practiced for eighteen months *l'essai loyal* of extraction without iridectomy ; I have entirely abandoned it."—Dianoux.

If iridectomy is to be performed in a given case, it would seem that a due regard for the safety of the eye would require that it be made as a separate operation. During its

performance certain conditions may arise which, while they may have little effect upon the healing process, would still delay and complicate an extraction made at the same sitting. The disinclination of the patient to undergo two operations is easily overcome, when he understands that he thereby increases his chances of a good result. The surgeon, moreover, becomes acquainted with the idiosyncrasies of the patient, and the tolerance of the eye to operative procedures, and is better prepared to combat a tendency to unfavorable results. Furthermore, the coloboma affords a free field for the examination of the lens, and enables the operator to acquire information which may be of decided use at the final sitting. Many good operators employ this method, and Landolt, in the course of the article before referred to, presents a number of arguments in its favor, which, summed up, are as follows :

1st. Immature cataracts ripen more rapidly after iridectomy.

2d. Inspection reveals shape, size, and position of the lens, and whether luxated or not.

3d. The operation is adapted to all cases.

4th. The operation under these conditions requires less dexterity.

5th. It is easier to use the cystitome.

6th. It renders the use of traction instruments easy.

7th. The exit of the lens does not bruise the iris.

8th. It affords easy exit to the cortical masses.

9th. No danger need be feared if some cortex be left.

10th. As there is no fear of prolapse of the iris, so there is less need of early inspection and possible irritation and infection of the eye.

11th. It renders secondary operations easier.

With a view of ascertaining the methods in use in our own school, the writer caused a circular letter, containing the question, " Will you kindly send your experience with, and opinion of, the simple operation for cataracts?" to be sent out. The responses are appended in the order of their receipt :

I have had very little personal experience with the simple extraction operation. I have only done one in my life upon a living eye, and I don't think I shall do another. My opinion is that it offers no advantage over the operation with iridectomy, except that pertaining to cosmetic effect—leaving a round pupil. On the contrary, I feel that few operators, except possibly Knapp, operate sufficiently often to make them dexterous enough to perform this operation as safely and skillfully as they do the other form.

I doubt whether we have the right to operate for cosmetic effect when vision hangs in the balance. I am in favor, in the majority of cases, of the preliminary iridectomy, and always perform it when the patients will consent to the double séance. This they usually gladly do when the increased advantages are explained to them.

WM. R. KING,
Washington.

I have made the simple extraction in all my cases of late, except in those old people whose pupil will not dilate fully. On the whole it has proven more satisfactory than the combined method, and I use it unless contra-indicated in special cases.

JOHN L. MOFFAT,
Brooklyn.

Your letter received. I presume you mean my opinion of the simple operation as compared with that with iridectomy, and so will say that my experience has led me to prefer the latter. I do not find that an upward iridectomy confuses the vision sufficiently to constitute an objection, whereas I do find that the more rapid healing process, absence of prolapse of iris, and freedom from tendency to iritis in the latter are all of superior advantage.

JOHN H. PAYNE,
Boston.

I am very sorry I can give you no data regarding the simple operation for cataract from personal experience; but the fact is, I am satisfied with my results as far as influence or non-influence of the iridectomy is concerned, and therefore have made no change in my method of operating, still doing the modified Graefe, with iridectomy at time of extraction.

W. N. BELL,
Ogdensburg, N. Y.

My experience with the simple operation for cataract has been generally favorable in good cases. I prefer it as being less meddlesome. In extra-hazardous cases I do an iridectomy, and prefer a preliminary one.

HENRY C. ANGELL,

Boston.

When all the circumstances permit of the simple operation for the extraction of cataract, I think it productive of almost ideal results. But that it is adapted to all cases in a routine way I cannot admit, nor do I think it should be so applied.

C. H. VILAS,

Chicago.

For the removal of cataract I employ almost invariably a rather large von Graefe peripheral, linear section, usually combined with an iridectomy. I am very careful concerning cleanliness, simply using hot water for the purpose; thoroughly bathing the parts, as well as using boiling hot water for the immersion of all the instruments that are to be used in an individual case, combined with dipping in absolute alcohol, and finally again immersing in boiling water. I am often obliged to operate for secondary cataract, however. The use of a remedy selected in accordance with the simillimum has converted cases into that of success where a failure seemed imminent. Results thus far in uncomplicated cases are practically perfect.

FREDK. WILLIAM PAYNE,

Boston.

In answer to your query of the 7th of December asking my "experience with, and opinion of, the simple operation for cataract," I would say that the decided character of my opinion on the subject has thus far kept me from the possession of any experience in the "simple operation." Besides having witnessed many operations by both methods, by the representative men of two continents, and learning their opinions of the advantages and disadvantages of the simple plan; a short time ago, for the satisfaction of my own mind, I made a most exhaustive examination of the more recent literature on the subject, and as a result have arrived at the following conclusions: The chances of a successful issue and useful eye are unquestionably greater with than without an iridectomy, for the following reasons: The iridec-

tomy facilitates the exit of the lens, reducing to the minimum any possibility of bruising or prolapse of the iris. The same is also true as to liberation of the chambers from cortical fragments. The best statistics show no advantage of the simple method in the acuity of vision while they do show a much greater frequency of secondary cataract by the simple method and much more danger from secondary operations than in cases of extraction with iridectomy. All considerations of safety and practical utility seem to be supported by the old method, while, for the new, the only possible advantage that can be claimed is the cosmetic superiority, and possibly in some cases a reduction of the amount of photophobia. The most noted member of the Moorfields staff said, in the presence of the writer, that while he almost always extracted by the simple method he believed the time would come when no extraction would be made without iridectomy. Dr. Albertson, a pioneer homeopath of San Francisco, upon whom the writer operated for cataract in the spring of the present year, after an exhaustive comparison of methods, chose with most decided preference the iridectomy as offering the surest chance of a good result, and the fewest chances of failure, and he has no reason to regret his choice. With an experience in cataract extraction that leaves little to regret, my preference is for iridectomy at the time of extraction, and this would be the operation I should insist upon were my own eye the seat of senile cataract. Yet, notwithstanding these decided views, I am ready to adopt the simple method if statistics show that, with its few advantages over the older plan, it possesses the more important assurance of equal safety.

HAYES C. FRENCH, M. D.

San Francisco.

For the last two years my practice has been to attempt simple extraction in all cases of uncomplicated cataract where extraction was indicated. If the cataract is not readily delivered through the pupil without bruising of the iris, I do not hesitate to make the iridectomy, converting the simple extraction into extraction with iridectomy.

The most important step of the whole operation is the corneal section. For full-sized cataracts it comprises the upper half of the cornea ; for smaller, Morgagnian, and soft cataracts somewhat less. A perfect section passes in its whole extent exactly

through the transparent margin of the cornea, the knife remaining in the same plane throughout, and in completing the section care must be taken not to turn the blade of the knife either forward or backward. Accurate and firm closure of the section is thus secured.

The capsule is opened by passing the cystitome behind the iris and incising the capsule near its periphery, parallel to the corneal section. This leaves the center of the capsule unbroken, and prevents a bruised pupillary edge adhering to shreds of the capsule or remnants of the lens. If the cataract be hypermature, then removal of a piece of the thickened central portion of the anterior capsule is indicated.

Expulsion of the lens is effected by pressing the lower part of the cornea, with a Daviel's spoon, directly toward the center of the globe. When the lens presents in the gaping section, its exit is aided and followed up by slight strokes with the spoon on the outer surface of the cornea, so as to expel the lens, together with the cortex. Should the pupil not readily expand, its rigid sphincter portion is drawn backward with the wire loop. If the section is too small, it is enlarged at one end with a pair of strabismus scissors. In restless people and in prolapse of vitreous, remove fixation forceps and speculum, expel lens by pressure with the lids, clear pupil by pressing the edge of lower lid on cornea, but keep edge of upper lid away from the wound, and never insert a curette or spoon into the anterior chamber to scoop out remnants immediately after such instrument has passed over the cornea. During the operation drops of a 1 to 10000 bichloride solution are let fall on the wound and its surroundings.

After the iris has spontaneously or artificially recovered its position, clear the wound from end to end by stroking from within outward with a polished spatula previously dipped in bichloride solution. This clears away particles of the lens, it redresses a curved-in flap, and carefully adjusts the edges of the wound. Should the corneal section be too peripheric, make a small iridectomy at once, because peripheric (Graefe's) sections lead to prolapses.

I see no reason in the majority of cases to wash out the anterior chamber, nor to use eserine after the operation has been completed. When the operation is completed, and the patient can open and shut his eyes without disturbing the flap, a drop of bichloride

1 to 10000 is instilled, and the patient put comfortably to bed. After keeping his eyes closed for fifteen minutes and inspection shows everything to be all right, the dressing is applied. The dressing consists of a patch of moistened sublimate gauze and a pad of moistened absorbent cotton, fastened with two strips of isinglass plaster. The non-operated eye is covered in the same way for a day or two. The first day the greatest possible rest is secured. On the second day the sound eye may be opened, if that will secure more comfort to restless or old people.

Usually there is some pain for the first few hours after the operation, then the eye remains quiet. If after hours or days of quiet, the patient, by an injury, coughing, sneezing, or other violent exercise, or without any cause, feels a sudden sharp pain in the eye, which gradually dies down in an hour or so, then, in all probability, a prolapse has occurred. If informed of it within several hours, the eye should be opened; if the prolapse has occurred, cut the extruded portion and reduce the edges of the iris if there be no irritation. If the prolapse is noticed on the third or fourth day, leave it alone. When all irritation has disappeared, then operate. At the end of two weeks the patient may be discharged. If secondary discission of the capsule is demanded, it should be done early, before the changes in the capsule become too old. If glaucoma supervenes after the discission, prompt iridectomy is the remedy. Myotics control only the mild cases.

If, in beginning, the iris fails to respond promptly to light, or the cornea is flabby, so to speak, an iridectomy is the safest course. If aqueous spurts as soon as knife enters cornea, the iris will be sure to prolapse. In one case the aqueous escaped as soon as counter-puncture was made, the iris prolapsed over edge of knife, the section was completed, and the case made an uneventful recovery.

In conclusion, it seems to me that the danger in the simple operation comes from prolapse of the iris. In the combined operation the danger comes from incarceration of the iris in the wound. According to my experience incarceration is more frequent than prolapse. Examine any number of cases operated with iridectomy and incarcerations, and adhesions will be found in the majority. This leads to many reactive processes, not the least of which may be a sympathetic ophthalmia. Now, it is pertinent to inquire as to the cause of prolapse in the simple

operation. Traumatism and a peripheric section are the causes. In these cases where the iris is hurt or blood has been shed in the anterior chamber, the prolapse occurs. A large peripheric section is impossible without an iridectomy, and this is not so when the section is in the limbus.

These are my reasons for attempting simple extraction in every uncomplicated case of cataract where extraction is indicated. It is my opinion that the operation is a safe one, though I am aware that many surgeons prefer preliminary iridectomy in cataract extraction. The bruising of the iris can be kept at a minimum by using retractors or the wire loop, as stated in the foregoing. I see very little difference between the simple operation and the operation of extraction with an iridectomy at the same time. Of the two, the simple operation seems to me the safer one, aside from the cosmetic effect.

THOS. M. STEWART,
Cincinnati, O.

While I consider the simple operation the ideal one, theoretically, for the extraction of senile cataract I have never employed it, and therefore can express no opinion from personal experience.

My results from the combined operation have been so satisfactory that I have not thought it desirable to incur the added risks which seem to my inexperienced judgment to attend the operation without iridectomy.

These dangers, to my mind, are the following: The corneal incision, being less peripheral, brings any resulting opacity, in case of unsatisfactory healing, nearer the pupillary area; prolapse of the iris with burning and inflammation of the same and posterior synechiæ, capsulitis, and secondary cataract owing to retention of cortical remnants, and, as a consequence, more frequent discissions.

E. H. LINNELL,
Norwich, Conn.

For several years I have made only the von Graefe modified method of extraction in cases suited to that method.

In soft cataract the linear method has perfectly sufficed. Only in children the method of discission had been all that is needed. My conservative inclinations have kept me in well beaten paths. My experience in dispensary and hospital practice is not sufficiently large to allow me to take up newer methods, however well they may have served in special hands. I am watching

with eager eye each alleged improvement, but I cannot undertake them until better established.

T. P. WILSON,
Detroit, Mich.

I have never considered myself justified, for the sake of securing a round pupil, in abandoning extraction with preparatory iridectomy with its simplicity, certainty, and freedom from anxiety, for the so-called simple method with its risks of retention of cortex, iris prolapse, etc.

C. M. THOMAS,
Philadelphia, Pa.

I am still performing the simple extraction upon three-fourths of my cataract cases. I persuade about one-half of the remaining one-fourth to submit to a preliminary iridectomy. I can see no reason for abandoning simple extraction. Upon properly selected cases it is as free from danger as any other method ; it gives perfect cosmetic results, and, with an early secondary capsulotomy, secures on an average a visual power greater than any other method. At least such has been my experience, and I consider simple extraction the perfection of the art of removing a mature cataractous lens. Useful vision has not been lost in a single case by prolapse of the iris, and in only one has the prolapse been of sufficient amount to require excision. This later case I have just dismissed from the hospital with vision $\frac{20}{40}$.

I dress the eye with a very light compress of dry cotton held in place with isinglass plaster. I do not now use eserine after the operation. I do an early secondary capsulotomy upon sixty per cent. of my cases. Vision was improved in all cases but one. This was followed by severe iritis, and vision was permanently reduced one-half.

I am strongly of the opinion that the final result not only depends upon the nature of the cataract, but upon the character of the operator. Simple extraction requires rapid work. Some very capable surgeons are naturally slow in their movements, and do not, therefore, secure the best results by this method. By long experience an operator acquires unusual skill in operating by "his method," and he has the best results by sticking to it and not trying to adapt himself to the "new."

E. J. BISSELL,
Rochester

I have no experience with the simple operation. This summer in Paris I found the operators preferred the iridectomy, but often did the simple operation for cosmetic reasons, but stated the risks were greater.

C. F. STERLING,

Detroit.

In reply to your questions about the "simple operation for cataract" I confess I have but little to say in the way of practical or actual experience. It has been a most interesting subject to me in so far as trying to keep abreast with the literature of the question. At times the *pros* and *cons* have been rather positive. I have attempted the operation a few times with good results, but the cases were usually selected after the corneal incision had been made and the conditions looked favorable, so that my cases could hardly be classed with a series of cases, as cases come.

At the same time I have come to some conclusions satisfactory to myself, if not to others. First. If successful, it is a most satisfactory operation, cosmetically speaking, to the trained eye of the oculist, though doubtfully so to the everyday glance of the busy crowd as they pass by, which is the one we are thinking of. Second. The resulting vision I can't see is much better, and that is the all-important point with our patient. Third. The possibility of complications during and after the operation is, in my mind, greatly increased in the hands of the operator who has but his private practice to obtain his cases from, and where his all, as it were, depends upon the result. A Knapp, with his almost unlimited number of cases, no doubt may be able to gain the necessary skill to take the eye out and scrape it and put it back again, as I have many times been assured by patients that some one of their friends in their early childhood had had done for them, but up to date it has never been my good fortune to witness such an operation.

In conclusion, I can only say that I consider the operation in the hands of one who has the opportunities of a Knapp a most brilliant success, but for those of us whose lot is cast in that section of the country known as provincial I feel that the old and beaten track of an iridectomy is best. Of all that has been said or written upon the subject the words and conclusions of that most thoroughly practical sage of the present period of ophthal-

mology, Landolt, published during the past year in the *Ophthalmic Record*, I feel are the best.

He gives it all credit. At the same time, he does not seem to feel that it offers any overpowering points of merit. For his labors in making so thorough and unbiased an investigation of the subject, coupled with his ripe judgment, gained from the most fruitful fields of experience, I feel that we all should offer thanks, if not, as I do, words of praise. In expressing myself as I have I wish to make myself clear by saying that I fully believe that many things are possible, and most surely the best for those granted by nature and by the advantages of exceptional opportunities to do, that others who are trying their best, with only a fair amount of nature's gifts and but little opportunities, should not attempt.

SAYER HASBROUCK,
Providence.

I have had but little experience in the simple operation for cataract. I usually make the modified Graefe section with iridectomy, and have been so uniformly pleased with the results in proper cases that I have refrained from experimenting with other methods till fully satisfied that they offer something better.

E. W. BEEBE,
Milwaukee.

I have never removed a lens without first making iridectomy. Have not had one single prolapsed iris in five years. A *very small* preliminary iridectomy, made two or three weeks before removing lens, is the method I have never departed from in dealing with senile cataract.

B. B. VIETS,
Cleveland.

I have made the "simple operation" in twelve cases. In three of these prolapse of the iris occurred, one instance being due to destructive hemorrhage which resulted from a fit of coughing a few hours after the operation. In one of these cases the visual result was good; in the second, moderate; and in the third, vision was totally lost. In those cases in which there was no iris prolapse, the ultimate vision was good in every instance. The incision has been made in the sclero-corneal border, involving a trifle less than the upper half of the cornea, the puncture and counter-puncture lying 1 mm. above the horizontal diameter of the

cornea. The capsulotomy has usually been peripheral, across the upper portion of the capsule. After the escape of the lens, the complete evacuation of the pupillary space has never been as easy as in those operations where iridectomy has been performed. After the completion of the toilet of the operation, the plaster strip has been used as a dressing. In two instances the wound was opened by an accidental blow on the eye upon the second or third day, no harm resulting. My own experience with the "simple operation" has been too limited to make it the basis of definite convictions, but my impression is that its chief point of superiority over the "combined operation" is the cosmetic advantage of a round mobile pupil, but that this advantage is largely offset by the occurrence of prolapse of the iris in a considerable percentage of cases (perhaps twelve to fifteen per cent. among operators generally). I am inclined to believe that, for general adoption, a safer and more satisfactory operation will be found in De Wecker's "three millimeter flap operation." The iridectomy is small, and produces but a slight deformity; the section is ample for the escape of any lens; the lens is easily delivered, and is never caught by the border of the iris; the pupillary space is readily cleared; and, so far as I can judge, the visual results are quite as good as those from the "simple operation."

HAROLD WILSON,
Detroit.

The simple operation for extraction of uncomplicated cataract I prefer to the one combined with iridectomy, either at the time of the extraction or previous to it. In several cases where I have started in to perform the simple operation, I have thought it advisable at the time to make a small iridectomy, because I supposed that there was danger of iritis on account of bruising of the iris at the time of the delivery of the lens, and in these cases there was no reaction; and since then, where the iris has unavoidably been treated somewhat roughly, I have not made the iridectomy, and have had no bad results.

My reasons for preferring the simple method are, the better cosmetic effect and the fact that the eye is left in as nearly a normal condition as possible, leaving a pupil which will react to light.

In twenty consecutive cases I have only had a slight prolapse of the iris in one case, and in another an adhesion of the pupil-

lary edge to the inner side of the wound. In the other cases there were no complications—nothing more than a moderate degree of redness and slight pain, as a rule ; and I was able to dilate the pupil in all, although adhesion to the capsule occurred several times, but these yielded to the continued use of mydriatics.

It is undoubtedly a little more difficult to extract a lens which must push the iris before it, but, from the good results and excellent vision obtained (in the majority not less than $\frac{2}{40}$, and in some cases $\frac{2}{30}$), I think it is the operation to be performed, as we also avoid the delay between the iridectomy and extraction ; and, if necessary to perform iridectomy, I see no reason why it cannot be done at the same time, as, in cases that I have done this, there has been but very little inflammatory reaction.

C. C. BOYLE,
New York.

POINTS TO REMEMBER.

Adenitis Cervicalis et Submaxillaris.—Enlarged submaxillary and cervical glands rapidly disappear, under the cataphoric treatment by iodine. A cup-shaped electrode, containing in its cavity a bit of absorbent cotton, or a flat one with absorbent cotton placed over it, may be used. This is saturated with iodine, and applied over the enlarged glands, and connected with the positive pole of a galvanic battery. The negative electrode is applied to the back of the neck, or may be held in the hand of the corresponding side, and a current of four or six milliampères is allowed to run for ten minutes. This is repeated every other day, until the swelling disappears. In some cases these enlarged glands disappear more rapidly when the faradic current is used. Iodine, or the calcaria iod. 2x, should also be given three times a day.

Treatment of Tubercular Laryngitis.—The best results are obtained by the application of lactic acid, twenty to eighty per cent. This should be preceded by insufflations of a mixture of equal parts of antipyrine and starch. The analgesic effect of these insufflations in the larynx is more marked and more lasting than that produced by cocaine. It also presents the further advantage of being free from toxic action.

Operating on the Larynx.—If you wish to remove a small growth from the larynx of a patient, whose throat-muscles go into spasms the moment the larynx is touched, the best method to follow is to gradually accustom the throat to instrumentation. Seven or eight times a day let the patient oil his index finger, and, having passed it into his mouth

raise the epiglottis. Once a day let the forceps be put in his throat, and simply touch the larynx. After a few days, the throat will be tolerant, and so accustomed to instruments that you may easily grasp a tumor or perform any operation you wish.

Rheumatic Pharyngitis.—In obstinate throat affections, when local treatment seems to fail, bear in mind the effect of the rheumatic dyscrasia upon the tonsils, uvula, pharynx, and larynx. Often a total cessation of local treatment followed by general anti-rheumatic treatment will be successful. The remedies most frequently prescribed are rhus. tox., ledum, bryonia, soda salicylate.

Nasal Hemorrhage after Operations.—Peroxide of hydrogen is useful for arresting nasal hemorrhage, immediately after operation. The undiluted solution should be sprayed in the nose, where it will mix with the blood and form a firm clot that will arrest the hemorrhage by pressure, the same as tamponing with cotton.

Treatment of Atrophic Rhinitis.—Applications for atrophic catarrh should be in the form of powder, as they produce better results than can be obtained from oily or watery solutions. The reason for this is that the stimulating effect is more lasting.

The following medicinal powders will be found to answer in most cases: Euphen, boracic acid $\frac{3}{4}$ i, oil of mustard m ij. One of the best applications is boracic acid, plantago, and calendula, to which, in some cases, may be added a drop or two of oil of mustard. Boracic acid with calendula, and boracic acid with plantago, may be obtained from the homeopathic pharmacy. These are mixed together in equal parts, and applied with a powder blower. The nose should be thoroughly cleansed with some bland solution such as pankotine; it being the only known non-irritating solution. The cavities should then be wiped out with absorbent cotton, care being taken to remove all scabs from the cavity. Then, by means of the powder blower, the powder is made to cover all parts of the mucous membrane lining the cavities. These applications should be made by the physi-

cian three times a week, and the patient furnished with the mixture for home use. He should be directed to use the powder three times a day with the powder blower, after first cleansing the cavities.

This treatment, if persisted in, will give the most satisfactory results, and confute the statement so often made that atrophic catarrh is not amenable to treatment.

CHARLES E. TEETS.

BOOK REVIEWS.

A CLINICAL MANUAL OF DISEASES OF THE EYE, Including a Sketch of its Anatomy. By D. B. ST. JOHN ROOSA, M. D., LL. D., Professor of Diseases of the Eye and Ear in the New York Post-Graduate Medical School and Hospital; Surgeon to the Manhattan Eye and Ear Hospital, etc., etc. Illustrated by 178 engravings and two chromo-lithographic plates. New York: Wm. Wood & Company, 1894.

As the author states, this work is not intended to be profound, the object evidently being to furnish a good working text-book for the general practitioner. A concise account of the anatomy and physiology of the eye is given in the opening chapters, followed by a description of the most recent methods of examination. Among other things, directions for the use of the Javal-Schiötz Ophthalmometer are given considerable space. Chapter X. is devoted to an account of the principal operations, the subject matter being freely illustrated by plates. Part III. contains a brief description of the various diseases and their treatment; the author, as a rule, contenting himself with simple statements of fact, without comment. The most interesting portion of the work will be found under Part IV., which considers the errors of refraction and accommodation, and affections of the ocular muscles. Here the individuality of the author finds its best expression, and the specialist will be interested in the theories and recommendations set forth as representing the experience of an able and conscientious physician. We feel compelled to take issue with Dr. Roosa when he indorses Javal's rule that a corneal astigmatism need not be corrected unless it exceed 0.50 diopter. In these days of accurate work, when we sometimes find it necessary to prescribe astigmatic lenses of as low power as $\frac{1}{8}$ D. in order to relieve asthenopia, and in which nearly, if not quite half, of the cases of astigmatism presenting do not exceed from .50 to .75 D. (in private practice), this rule, it would seem, should become

obsolete. For the same reason we must take exception to his statement that "We may with propriety, and with great advantage to accuracy and consequent benefit to the patients, abandon all other methods for determining astigmatism, except in very rare cases, and trust entirely to the ophthalmometer." An instrument which is acknowledged to vary from .25 D. to .50 D. by many of its advocates can hardly be deemed sufficient to determine the result in cases where absolute accuracy should be the first consideration. We agree entirely with the author in his statement that cases with both astigmatism and hyperopia may be relieved of asthenopic symptoms by the use of cylindrical lenses alone. To the specialist the numerous statistical tables incorporated will be particularly interesting. The volume is gotten up in the usual excellent style which is characteristic of the well-known publishers.

CHARACTERISTIC MATERIA MEDICA MEMORIZER. By WM. H. BURT, M. D., Author of *Characteristic Materia Medica*, *Physiological Materia Medica*, etc., etc. Chicago: Halsey Bros. Company, 51 and 53 Dearborn Street, 1895.

In this little volume Dr. Burt seems to have, in a certain degree, aimed at a combination of his *Characteristic Materia Medica* and his *Physiological Materia Medica*. While the latter element does not attain sufficient importance to dominate the work, it is still too much in evidence for a production supposed to be composed entirely of characteristic symptoms. Whether this be regarded as a fault will depend much upon the inclinations of the reader.

Many of the newer remedies are treated of, and all in a concise and interesting manner. The book is well worth a place in the library of every physician.

ESSENTIALS OF HOMEOPATHIC THERAPEUTICS. Being a Quiz Compend upon the Application of Homeopathic Remedies to Diseased States. A Companion to *The Essentials of Homeopathic Materia Medica*, arranged and compiled especially for the use of students of medicine. By W. A. DEWEY, M. D., late Professor of *Materia Medica*, Hahnemann Medical College, San Francisco, Cal.; Associated Author of *The Twelve Tissue Remedies of Schüssler*, etc., etc. Philadelphia: Boericke & Tafel, 1895.

Perhaps no book has recently been received by medical students with as much enthusiasm as Dewey's *Compend on Thera-*

peutics. This little gem has in condensed form the meat of works several times its size, and at first sight it would seem impossible that so much could be given in such small space.

The diseases with their remedies are systematically arranged and tabulated. The common conditions found in everyday practice are taken as headings, and under each are given the characteristics of the remedies most likely to be indicated, with many differentiating symptoms ; the whole being arranged in a series of questions and answers admirably calculated to impress the subject matter upon the mind of the student.

THE PRACTICE OF MEDICINE. By WM. C. GOODNO, M. D., Professor of Practice of Medicine in the Hahnemann Medical College of Philadelphia ; Physician to the Hahnemann Hospital, etc., etc. With sections on The Diseases of the Nervous System, by CLARENCE BARTLETT, M. D., Lecturer on Mental and Nervous Diseases in the Hahnemann Medical College of Philadelphia ; Senior Neurologist to the Hahnemann Hospital, etc. Vol. I. Specific Infectious Diseases and Diseases of the Nervous System. Philadelphia : Hahnemann Press, 1894.

Goodno's work on Infectious Diseases and Diseases of the Nervous System combines all those qualities which go to make up an interesting and valuable text-book. The language is simple and to the point, the style pleasing. His classification of the different diseases is most excellent and completely does away with the possibility of confusion.

The definition of each disease, with its history and etiology, is first given ; the symptoms which would lead to a correct diagnosis being next in order. He then mentions conditions upon which a successful prognosis may be based. The treatment of the disease, advancing the latest and most popular ideas, which embraces the hygienic as well as the medicinal treatment, is given in full detail.

Particular attention is drawn to the subject of contagion and infection, the author giving a few useful rules by which such contingencies can best be avoided.

The portion on Nervous Diseases, by Clarence Bartlett, M. D., is most interesting, the chapters on Syphilis being especially so. Dr. Goodno exhibits great skill in his handling of Typhoid, Scarlet, and the other fevers, and many valuable hints are given which will no doubt interest both student and physician.

The work is well printed and neatly bound. The author is to be congratulated on placing such a valuable work before the medical profession.

THE HOMEOPATHIC EYE, EAR, AND THROAT JOURNAL. Editors : A. B. NORTON, M. D., C. H. HELFRICH, M. D., and J. B. GARRISON, M. D. Published monthly by James A. Robinson, 124 W. 84th St., New York. Vol. I., No. 1, January, 1895, pp. 32.

As stated in the introduction "the JOURNAL proposes to . . . show the physician in general practice not only how to treat the everyday cases met in his work, but also to point out to him the indications of those cases requiring special examinations and treatment."

The seven articles in the initial number are short and elementary, and should be easily understood by any general practitioner. This little journal is neat and bright-looking, and will doubtless make a place for itself.

D.

THE JOURNAL OF OPHTHALMOLOGY, OTOLOGY AND LARYNGOLOGY.

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MATERIA MEDICA AND THERAPEUTICS OF THE EAR.

BY WM. E. ROUNDS, M. D., NEW YORK.

ACONITE.—Tearing pains in the ears with *a tickling sensation as of a worm or something alive in the ear*. Roaring in the ears during an attack of acute coryza with a sensation as though the ears are stopped, preventing the sound-waves striking upon the drumhead. At the beginning of an attack of coryza the ears are very sensitive to sound, so that every noise is intolerable. Pain in the mastoid process, with a feeling as if swollen, with a general full feeling in the ears. The throat feels raw as though it had been scraped, with burning and stinging, with a difficulty of swallowing and a sensation as though an astringent had been used. There is a general feeling of swelling of the whole throat, with a burning or smarting sensation which passes off while eating or by moistening the throat. Generally this sensation is very troublesome in the night, causing him to awake often and moisten the throat with water. Stinging or dragging sensation high in the throat in region of eustachian tube. Itching in the region of the eustachian tube, which he attempts to relieve by muscular action of the throat. The fauces are red and swollen and covered with saliva.

These symptoms nearly all point to the use of aconite in

acute conditions. During the epidemic of grip from which we are now emerging, *aconite* has been a wonderful remedy, and I am sure has saved many a patient from acute inflammation of the drum. Many times, when my patients have been suffering from the above symptoms—swollen, moist throats—pain and roaring in the ears and itching in the region of the eustachian tubes with high fever following a chill, I have seen aconite relieve the congested condition of the mucous membrane by bringing into activity the sluggish sweat glands all over the body. Grip this year has been especially prone to attack the ears with great force from the very start, as is shown by the unusual number of serious inflammations of the drum and adjacent parts which have come to the notice of the aurist. My opinion, based upon personal experience, is that many of these cases might have been prevented by the use of *aconite* or some other remedy covering the symptoms of the attack of grip, the *total symptoms*, instead of giving the remedy covering the symptoms of the influenza of which the patient usually complains the most. I have repeatedly seen the use of *arsenicum*, *pulsatilla*, *arsen. iod.*, and especially *allium cepa* stop all the naso-pharyngeal symptoms and precipitate an acute attack of the drum. I am just beginning to realize what a warder off of evil we possess in aconite.

Aconite is chiefly useful in acute conditions, but I find it of great service in the treatment of chronic catarrh of the drum in a certain class of cases. Many cases do well up to a certain point—improve in hearing—the tinnitus subsides and everything goes well until, generally from some sudden atmospheric change to which our climate is so prone, a tickling raw sensation in the throat is complained of and the old symptoms of tinnitus and deafness—stiffness—reappear and the whole ground has to be again gone over. I have found that aconite 6x controls these attacks so that no ground is lost in the treatment. In all chronic conditions, when the patient is not confined to the bed, aconite should be given as high as the 6x. The lower potencies make the patient more susceptible to taking cold.

AGARICUS.—This remedy is said to be useful in the treatment of frozen ears. It has the symptoms: *Itching, redness and burning of the ears, as if they had been frozen.* I have known it to cure a case of diffuse eczema of the auricle which had not yielded to other remedies. It was prescribed upon the above symptoms.

ALUMINA.—Tense feeling in the ear, stitches in the ears; stitches in the ears as though coming up through the eustachian tube; itching deep in the ears, with a discharge of bloody excoriating mucus. The itching is made worse by attempts to relieve it. The canal is red and sore, and itches intensely. *Chronic* suppuration of the drum, with the middle ear filled with granulations, with great itching and sensitiveness to touch. The granulations bleed easily, and the discharge is very offensive,

Chronic suppuration of the drum, with ulcerative catarrh of the nose, and a discharge from the nose of thick, yellow, offensive mucus, often streaked with blood. Pain over frontal sinuses and between the eyes, with ozena. Chronic nasal catarrh, with discharge of thick, yellow, blood-streaked mucus, and great sensitiveness of the nasal passages. Constant sensation as of a cold in the head, with frequent sneezing. Alternate dry and fluent coryza. Great dryness of the throat, with rawness and feeling as if scraped, *relieved by warm drinks.* Constant accumulation of mucus in the throat, mostly coming from the posterior nares. This is a good remedy for many cases of chronic suppuration of the drum, in which the middle ear is filled with sensitive, easily-bleeding granulations and ichorous discharge. When there is an ulcerative nasal catarrh, with great sensitiveness and offensive discharge, the remedy is still more distinctly indicated. I have used the remedy locally in the 2x trituration, but have found the external auditory canal rather intolerant of it.

AMMONIUM MURIATICUM.—This remedy has all the symptoms of catarrh of the drum. Hardness of hearing, with a tinnitus of a roaring character, *thundering noises* in the ears, with feeling as though they were stuffed full of

wax. Snapping and crackling in the ears, and bubbling when blowing the nose, as though the ears were filled with fluid. This remedy has been of great use to me in cases in which there has been a persistent accumulation of mucus in the drum. My attention was first called to it by the relief of these ear symptoms in a case of subacute bronchitis, for which ammonia mur. was given. As the accumulation of mucus in the bronchial tubes diminished, the swelling of the lining of the eustachian tube lessened, and the hearing cleared with a loud pop, sounding like a gun in the ear, and the tinnitus immediately ceased. I have used it in many similar cases with a like result, where the bronchitis has not been present. This remedy should always be thought of in persistent accumulation of mucus in the middle ear, with loud roaring and great deafness. I have always used tablets of the 2x trituration.

ANACARDIUM.—Cramp-like pains in the external auditory canal; painful pressure in the external auditory canals as though plugs were being driven into the ears; drawing in various parts of the organ of hearing; a feeling of tension throughout the ears; a great many pains throughout the external ears; pain in the ear when swallowing and when pressing the teeth together; tearing and throbbing pains in the cartilage of the ear and in the external auditory canal; the pain is increased by inserting the finger into the ear, and there is a feeling as though the hearing had become obstructed; painful swelling in the outer ear (external auditory canal); feeling of obstruction in the ear with tenderness and pain in the external auditory canal.

This remedy has not been frequently used in diseases of the ear. The symptoms point to its use in external otitis, especially of the furuncular variety. The symptoms of the skin emphasize this. It should be useful in recurrent *otitis externa circumscripta*, as the result of a certain form of nervous dyspepsia.

ANTONIUM CRUDUM.—Itching and titillation in the external ear, as of many living things moving about there; itching in the external auditory canal with discharge; the

external ear becomes red and swollen and itches, apparently from the contact with the discharge. This remedy has many ear symptoms, but they are not at all characteristic. I remember using the remedy with decided improvement of the conditions of the ear, but have been led to prescribe it by the gastric and mental symptoms.

ARGENTUM NITRICUM.—*Tinnitus Aurium*.—Ringing sounds in the ears, as of bells; clear ringing in the ears, followed by a stopped sensation; tinnitus which increases the deafness; whizzing sounds in the ears with obstruction of hearing. The direct ear symptoms of argentum nitricum are not so characteristic as the symptoms of the nose and throat.

Nose.—The nasal bones are painful, as if bruised; pimples on the nasal septum and small points of ulceration which bleed easily; internal soreness of the nose from external pressure; discharge of bloody pus when blowing the nose; a profuse yellow discharge from the nose which is very offensive; the nose feels obstructed and is not relieved by blowing out large quantities of pus; dullness of the sense of smell. Examination of the nose shows many little points of granulation upon the septum and turbinated bones.

Throat.—*Dark redness of the uvula and fauces*; the uvula is swollen, elongated, and of a dark red color; the uvula is sore and causes a constant desire to swallow; there is a feeling as though the upper surface of the uvula is ulcerated; burning dryness in the throat, which is increased by swallowing cold water; sensation as though a splinter had become lodged in the throat; a sensation in the upper part of the pharynx which causes him to hawk constantly, with a discharge of thick tenacious mucus. Examination with the rhinoscopic mirror will show the region of the eustachian tubes swollen and red, and many times the faucial openings of the tubes filled with tenacious mucus.

In spite of the fact that the purely ear symptoms of argent. nitr. are extremely meager, it has proven a valuable remedy to me in the treatment of chronic catarrh of the

drum. By the use of this preparation of silver and the judicious use of the post-nasal syringe, I have been enabled to restore the practical hearing in very many cases. The above symptoms of the throat are characteristic and reliable. My results have been produced by the 2x and 3x triturations. In many cases which have been slow to yield, so far as improvement in hearing is concerned, I have obtained most remarkable results by the application of a weak solution of the nitrate of silver directly to the posterior wall of the upper pharynx and the mouths of the eustachian tubes. I have usually employed a solution of the strength of five to ten grains to the ounce of water. It never causes pain, and I never follow it with a neutralizing solution. I rarely use Politzer's air bag until I have controlled the swelling and discharge.

As a local application, *argentum nitricum* has been of service to me in the treatment of a certain form of otorrhœa. When the membrana tympani has been largely destroyed, so that a large perforation remains and discharge persists in spite of all the usual remedies, and from the nature of it I am sure it is not due to caries of any part of the middle ear, it is very apt to be caused by small points of granulation so hidden that a direct application cannot readily be made. In these cases it has been my custom to fill the middle ear and external auditory canal with a five or ten per cent. solution of the nitrate of silver and force it through the eustachian tube into the throat by folding the tragus over the meatus auditorius externus and pressing gently upon it. This procedure may be repeated two or three times a week, and the strength of the solution may be increased if necessary.

A CASE OF PARALYSIS OF ACCOMMODATION.

BY N. L. MACBRIDE, M. D., NEW YORK.

HENRY O., thirty-one years of age, an apparently healthy man, called at the New York Ophthalmic Hospital complaining of not being able to see, and claimed that he had lost his sight very suddenly. He stated that he was a printer by trade, and that for two weeks prior to the attack he had worked at setting type night and day. At no time during the two weeks had he worked less than twenty hours out of the twenty-four. For a few days before his sight became dim, he was annoyed by a burning sensation in both eyes and a sharp pain in the right temple. The letters appeared to be double. These symptoms were followed by an inability to see type. Repeated questioning did not elicit any other symptoms. It was two days after this attack that he came to the hospital clinic. An examination revealed what appeared to be a strong, healthy man. All his other functions seemed to be normal. He presented no symptoms of lead poisoning, and stated that he had no venereal disease, nor had he suffered from any sickness for years. One year previous to this time his sight became weak from overwork, but at that time he did not lose his sight and the impairment of it lasted only for a short time. His acuity of vision was tested with the following result :

Right eye vision, $\frac{2}{30}$ (?).

Left eye vision, $\frac{2}{40}$ (?).

His refraction was astigmatic. Correction of this refractive error made the vision of the right eye equal $\frac{2}{30}$ (?), of that of the left eye to equal $\frac{2}{30}$. He seemed to have no range of accommodation—his far and near point coincided. The nearer the test types were brought toward his eyes the dimmer they became. His power of convergence was good. At this time he had no

diplopia and the muscular system of the iris appeared to be normal, the pupils dilating and contracting promptly in response to light. They also contracted in a marked manner during convergence. The tension of the eyes was normal. An ophthalmoscopic examination showed the vitreous and lens to be normal. The optic disk was quite red, its outlines indistinct, and the retinal veins were dilated and tortuous. Duboisia 3x was given him, as he seemed to have many symptoms that are recorded in the proving of that drug in Allen's "Handbook of Materia Medica and Therapeutics," viz.: Pain in the eyes when reading; could read better and print looked blacker at twice the usual distance; sharp pain in upper part of eyeball, afterward paralysis of accommodation; eyes hot and tired; hot and dry; optic disk very red, small vessels of disk visible, large vessels enlarged and tortuous, outline of disk indistinct, retinal veins dilated; whole fundus hyperæmic; accommodation paralyzed. Could not read Jager's No. 1 at any distance; accommodation paralyzed before the pupil was fully dilated and continued after it had regained its normal size.

In spite of the fact that this proving presents so many symptoms resembling those of our patient, he returned in three days without having had relief from his symptoms. An examination made at the time of his second visit to the hospital revealed the same condition found at the first examination, notwithstanding the fact that he had given his eyes perfect rest during the time between his first and second visits. This time acon. 1x was given him on the following indications: Burning pain in the eyes; contraction alternating with dilatation of the pupils, with dim vision; weak vision with diplopia. In two days the patient returned saying he was very much better. His accommodation was then tested and he could read Jager's types No. 2 at twelve inches. The fundus was less hyperæmic and he improved steadily. At the final examination, with the astigmatism corrected, his vision was $\frac{20}{20}$ with slight difficulty, and he could read Jager's No. 1 at eight inches. The fundus showed no congestion, and the only symptom he complained of was a tired feeling after reading for some little time. This symptom will probably be relieved when he wears the glasses that correct his astigmatism.

The case seemed interesting and instructive to me for these reasons: First, that the strain under which not only

his eyes but his whole system had been laboring for two weeks had caused a failure of only one organ of his body, and of only a limited part of that organ. The question is, had his eyes been emmetropic, would some other part of his system have broken down? The second point is the contraction of the pupil during convergence when the muscle of accommodation was in a state of paralysis. This fact was noticed by Professor O'Connor, neurologist to the hospital, who suggested that perhaps the contraction of the pupil which takes place during near vision is more intimately associated with convergence than with accommodation. The third point is the prompt response to aconite, which would go to prove it the indicated remedy, in spite of the fact that duboisia seemed to cover so many of the symptoms.

SOME DEFECTS OF SPEECH IN CHILDREN.

BY C. GURNEE FELLOWS, A. M., M. D., CHICAGO.

IN looking over the current literature to get some assistance in the treatment of defective speech in children I found little to help, and even in the text-books I found but little outside the classical articles upon stuttering and stammering, and even then not much by way of treatment.

Some children learn to walk and talk at a much earlier age than others, and but little attention is paid to those who are late in developing the power of speech, the thought being that they will be all right in time. Other children attempt to talk, but make sorry work of it, being understood only by those who constantly associate with them, who, knowing their attempts at speech, are enabled to interpret it.

A sound body naturally develops in about the same proportion, and with some glaring defect we are apt to find others associated. Is there in any case a tangible cause for the failure to develop all the natural powers?

Of late, in the study of adenoid vegetations, we have seen how many are the ills which they may cause; and prominent among them, the slow development of the mind, a less active memory, a lessened capability of grasping new subjects, and this often as a part of slow physical development and an apparently poor constitution. I have often wondered if it were not true, and I believe it is, that the same causes are at work in the later development of the power of speech or imperfect speech utterances in some children which show themselves in other channels, as above men-

tioned. Stammering and stuttering are distinctly different in their manifestation, but may be due to the same cause and present in the same individual.

"Stammering consists in eluding syllables or individual sounds, or blending them together, or substituting one for another.

"In stuttering there are a series of spasmodic forcible expiratory efforts before the word can be framed."

Defects of speech may be functional or organic in origin. The central nervous causes, though important, belong to another sphere, and only one class of functional causes will be here considered. One may stutter only when tired and at other times speak correctly, but stammering is more apt to be constant as a habit or from some continued cause.

Malformations have always been recognized as prominent causes, among them being hare-lip, cleft palate, and tongue-tie. At one time the operation of clipping the *frænum linguæ* was the royal road to a cure, afterward taking its proper place as applicable only in certain cases. We recognize the above-mentioned causes as operative still, but I believe that, among the mechanical causes producing both a direct and reflex action, the tonsils, pharyngeal, post-nasal, and lingual, should be placed as of prime importance. I believe that if we should look for it more we would find that defective speech is present in many of our adenoid cases, whereas we look more to the general physical conditions and that of the ears and nose.

In only one or two articles have I found any reference to such a possible cause of speech defects. But in a classical case reported years ago, I find reference to an extreme high order palate (an important sign—according to modern teaching—of adenoids), and I doubt not we could all prove their presence in some cases.

I do not want to lessen the importance of the other well-known causes, but simply emphasize this: Some four or five consecutive cases in my own practice have recently presented themselves. Imperfect speech, inability to articulate special sound, lolling, stuttering, and stammering, have

been noted and in each case in the presence of adenoid or tonsillar hypotrophy, or both, and in three cases, improvement followed the surgical treatment for their removal.

In many cases, stammering or stuttering becomes a habit, and even when the cause is removed, if mechanical, the habit must be cured by careful teaching.

The peculiar speech of children suffering with diphtheritic paralysis is well-known. It is also proven that adenoids, by mechanical pressure often produce a paresis or paralysis of the soft palate, giving us a similar defect in speech, and I believe the inference is true, that cases of defective speech have been set down as due to a paralytic soft palate, which were in reality only secondary to adenoid vegetations in the vault of the pharynx.

The remedy lies in their removal and afterward in careful teaching, till every letter and syllable can be distinctly spoken.

Free nasal respiration is necessary to the production of pure tone, and any interruption to it furnishes an added mechanical cause of defects in speech.

A UNIQUE EAR CASE—OTITIS MEDIA CATARRHALIS ACUTA.

BY HENRY C. HOUGHTON, M. D., NEW YORK.

HISTORY.—March 3, 1895 : Mrs. S., age fifty, a well-developed healthy brunette, had been ill at ease for a number of days, as from a catarrhal cold. At five o'clock she sent for her physician, having had a peculiar experience, a sudden eructation, the gas being forced through both eustachian tubes ; soon afterward the discomfort became very marked, and pain set in. Her physician, Edwin J. Pratt, M. D., found the canals clear ; the integument intensely red and a slight congestion of the periphery, Shrapnell's membrane, and along the manubrium. Ferrum phos. was given every half hour, and a four per cent. solution of hydrochlorate of cocaine given to mitigate the pain by local use.

At 9.30 the doctor called to arrange for a consultation, as the patient had experienced no relief ; and he requested that all details necessary for paracentesis be taken, as there must be some alleviation of the distress.

On entering the room the patient was sitting with head wrapped, restless, agonized look, begging for relief. Examination showed the right canal hyperæmic throughout, the membrana tympani congested, and anterior portion apparently covered by pus ; we then learned that in early life she had had earache, but it had not caused any solicitude on the part of her family ; lately they had noticed that she was dull of hearing if the right ear was toward the one speaking ; the left canal was hyperæmic throughout and the drumhead uniformly red, but not bulging. Hearing for watch, R. $\frac{1}{20}$, L. $\frac{6}{20}$, and for voice only loud tones could be heard.

A ten per cent. solution of cocaine was instilled in each ear,

and after five minutes a needle was forced through the drum-head both anteriorly and posteriorly as regards the manubrium; the puncture of the right did not cause much pain, but the left was very painful. Little or no hemorrhage followed. Muriate of quinine was given, third decimal trituration, every three hours, and ferrum phos., sixth decimal trituration, every half hour if pain and febrile symptoms occurred. Dr. Pratt left a few tablets of codine, 1-10, in case it was necessary to use more extreme measures.

The next day the patient was much better, relief followed the paracentesis almost immediately, and she had a fair amount of sleep; but the deafness was even more pronounced as the days passed.

March 14, Mrs. S. made her appearance at my office, at the request of her physician, for local treatment.

The canals had lost much of their redness, the right drum-head was better defined; dull congestion existed posteriorly and superiorly; anteriorly, what had seemed to be pus now appeared as an extensive yellowish-white interstitial opacity, the result of the old-time suppuration; the left membrane was clearer, thin, dry, dull red; eustachian tubes not dilatable. The patient was depressed, apathetic, free from thirst, with dull aching from hips downwards. Gelsemium > was given every three hours. H. D., watch, R. $\frac{1}{20}$, L. $\frac{1}{240}$.

March 15, much the same, less pus in tissues of R. *Mt.* Auto-inflation (nose and ears closed), dull sensation R. and free passage of air L., with no marked gain for watch. Great mental and physical depression. Gelsemium continued, and inhalation of oxygen.

March 16, better. Less depression; objective symptoms much the same; same treatment.

March 19, very much better, pains gone, R. *Mt.* dry, tissues clearly defined. Anterior half of membrane yellowish white, dense interstitial opacity, posterior portion thin, as if restored from falciform border, slight movement by Val. L. *Mt.* tissues clear and dry, quite sudden inflation by Val., with free motion of membrane at central portion. H. D., R. $\frac{10}{240}$, L. $\frac{20}{240}$, and for voice quite good. Apprehensive of return of trouble. Kali phos. >

Seen occasionally till March 27. Drumheads free from con-

gestion except at the periphery, and fairly mobile. Ett. dil. H. D., watch, R. $\frac{7}{20}$, L. $\frac{8}{20}$, and voice better than for years.

The prognosis is now very good. There is no apparent reason why the hearing should not become even better than for months past, because the right ear under the acute conditions will be more amenable to local measures, such as massage, inflation, etc.; also, internal remedies will produce changes in the subacute condition, which would be impossible in the dry, sclerosed state which existed before the acute disease. The same hold true in a greater degree for the left ear, and one may expect the hearing to reach $\frac{20}{20}$, so that there may be some compensation for the agony of the acute disease.

However, there is this to say: The above compensation is miserable comfort, because the whole history is one of mistaken counsel. When the laity, and the profession as well, realize that earache means acute otitis in the vast majority of cases, and that otitis is a parallel to conjunctivitis, they may come to act as wisely in the care of "earache" as of "pink eye."

One may learn another lesson from the above history, and the writer has learned it. The immediate resort to the puncture, joined with the local use of strong solution of cocaine, in my opinion, checked the progress of the acute disease, till the remedy or remedies had time to produce more general tissue changes; multiple puncture may be quite as effective as free incision, and much more readily repaired.

The objective and subjective symptoms are certainly unique. Escape of gas from the stomach into the middle ear is not uncommon, but the volume, the force, the almost instant result, of acute disease of the tympanum and its rapid and intense history, it has never been my good fortune to see, or the patient's ill-fortune to experience. One similar case comes to mind.

In October, 1893, Mr. E., age thirty-one, who had had suppurative otitis media with destruction of a large portion of the

drumhead, polypus, etc., was successfully treated with restoration of a neoplastic membrane in the left ear; the right had been affected in early life. During an attack of influenza he had a severe cough with prolonged sneezing; in a paroxysm air was forced through the right tube, and the hearing fell from $\frac{1}{2}\frac{8}{0}$ to $\frac{6}{24}\frac{6}{0}$. Examination showed a ragged rupture of the drumhead with clots of blood and ecchymosis all through the field of inspection. Gelsemium, with careful local cleansing, gave good results.

These cases show the extreme tenuity of neoplastic tissue built up from the mucous membrane, having little fibrous element to resist the force of direct pressure, or ulcerative processes; and they enforce the lessons of precaution and prophylaxis.

MATERIA MEDICA AND THERAPEUTICS OF THE EYE.

BY CHAS. C. BOYLE, M. D., NEW YORK.

ACETIC ACID.—The eyelids are swollen and œdematous; conjunctiva swollen and œdematous; conjunctiva of the lids is covered by diphtheritic or croupous membrane. Profuse purulent discharge.

Clinical.—Its special use is in croupous and diphtheritic conjunctivitis.

I used it some years ago successfully in a very severe case of croupous conjunctivitis where the lids were greatly swollen and œdematous; marked chemosis of ocular conjunctiva, that of the lids being covered with a false membrane; a profuse purulent discharge accompanied this. In this case I used it locally in proportion of about ten drops of acid to two ounces of water and gave the first internally. Cold applications were also used in this case.

ACONITE—Eyeball feels enlarged as if coming out of orbit. (Spig.)

Eye red, bloodshot, painful inflammation; pressive shooting pains, especially on moving the eyeballs; eyes feel hot, dry and burning, sensitive to the air; lids feel dry and burn.

Clinical.—I have used it in the acute stages and acute aggravation in almost all forms of conjunctivitis; in the hyperæmic stage, before the discharge appears, where the eye feels hot, dry, and painful. I always prescribe it after an incised wound of the eye and after removal of a foreign body. In the acute stage or acute aggravation of granular conjunctivitis, where the conjunctiva is very red and inflamed, feels hot and dry.

ACTEA RACEMOSA (CIMICIFUGA).—Congestion of the eyes during headaches; aching extending to the vertex; pain in the eyeballs; pain in the center and between the eyeballs and the orbital plate of the frontal bone < morning pain over the eyes extending to the occiput; pain extending through the eyes and head to occiput and down the neck; neck feels stiff; aching pain in the eyeballs or in the temples extending to the eyes; sharp shooting pains from occiput through to the eyes or darting from the eyes to top of the head.

Clinical.—I have frequently prescribed it in ciliary neuralgia, especially in women who have been using their eyes a great deal, the pain generally extending from the eyes through the head down the neck; neck feels stiff, or the pain may extend from neck up to vertex; head feels sore.

AGARICUS.—Spasmodic action of the muscles of the eye; spasmodic twitching of the eyelids and eyeballs; spasm of the ciliary muscle; motion of the type while reading, with aching and burning; black motes before the eyes, everything covered by a mist.

Clinical.—I have had good results in spasmodic twitching of the eyelids, also have seen benefit from it in nystagmus. It is useful in myopia due to spasm of the ciliary muscle. A case of loss of vision of about one year's duration, accompanied by twitching of the muscles of the eye and some hysterical symptoms, is reported cured by it. Also anæmia of the optic nerve, retina and choroid, with tendency to chorea. Any eye troubles accompanied by choreic symptoms.

ALLIUM CEPA.—Biting sensation, as if there were smoke under upper lids < night; lachrymation of left eye with redness of the eyeball; lachrymation < evening, in warm room; lachrymation, non-excoriating, with coryza; coryza acrid, burning, makes lids red and sensitive; eyes watery and suffused, capillaries injected; profuse bland lachrymation with redness of the eyeball; frequent sneezing; coryza; eyes sensitive to light.

Clinical.—Its usefulness is as a rule confined to an acute

catarrhal condition accompanied by a profuse bland lachrymation, but the discharge from the nose is thin and excoriating; sneezing. I have frequently seen excellent results with this remedy prescribed upon these indications.

ALUMINA.—Lids agglutinated in the morning on waking, with burning when opened and with dread of light (acon., bell., lyc.); eyelids thickened (puls., graph.) dry and burning (ars., sulph.); upper lids hang down as if paralyzed; burning and dryness in the lids every evening with pain in the internal canthus of the left eye, with much dry mucus in the morning on waking; burning and pressure in the eyes; dim sighted, obliged to wipe the eyes constantly which relieves (croc., euph., puls.).

Clinical.—It is used in some cases of subacute and chronic catarrhal conjunctivitis, also in granular conjunctivitis. I have used it occasionally in these cases, where there was the burning and dryness in the eyes and lids; eyelids weak, hang down.

ANACARDIUM.—The light seems to have a halo around it (bell., phos.); pupil contracted, later dilated; vision indistinct; blackness before the eyes with vertigo; pressure as from a plug on upper margin of orbit; pressure on eyeball from before backward or from above downward.

Clinical.—From the symptoms this should be an excellent remedy in glaucoma, although I have never used it.

ANTIMON. CRUD.—Eyes red, inflamed, with itching, nightly agglutination and morning photophobia; soreness of outer canthi (graph.); redness and inflammation of lids (arg. met., graph., lyc., merc. sol.); pustules of the cornea and conjunctiva; lids swollen, red, and excoriated.

Clinical.—It is used in blepharitis, also in scrofulous inflammation of cornea and conjunctiva, indicated by the presence of pustules on the eye and on the lids and cheeks; crusts on cheeks; stoppage of nose; nose sore and cracked; child is cross. I have prescribed both the *ant. crud.* and *ant. tart.* in these cases with good results.

APIS.—Burning, stinging and shooting pains; eyelids swollen, red, œdematous (ars., phos., rhus); upper lid

hangs like a sac over the eye (kali. c.); burning in margins of lids (arnica, sulph.) soreness and smarting; aching over and above the eyes > by pressure (asafet.); conjunctiva swollen and œdematous.

Clinical.—It is useful in all external diseases of the eye where there is present the swollen and œdematous condition; the œdema is pale and not so red as *rhus*. I have just cured a very bad case of pustular keratitis, accompanied by intensely swollen œdematous lids, also some chemosis of ocular conjunctiva; profuse muco-purulent discharge; crust and eruption on nose and chin; great photophobia. I have aborted dacryocystitis phlegmonosa in its early stage with this remedy. The lids, especially at the inner angle, were intensely swollen and œdematous, tender to touch. It is used in œdematous condition of the retina.

ARGENT. MET.—Redness and thickness of the lids; margins of the lids swollen, red and thick (ant. c., graph., lyc., merc.); violent itching of the lids and corners of the eye; pustules along the edge of the lids after measles (puls.).

Clinical.—It has been reported as being curative in blepharitis and also in case of stricture of lachrymal duct.

ARGENT. NIT.—Canthi blood red, with swelling of the caruncula lachrymalis, with clusters of red vessels extending from inner canthus to cornea (zinc). Red swelling around the cornea, toward inner canthus. Redness of the conjunctiva of eyes and lids. Profuse purulent discharge. Photophobia, eyes filled with mucus. Swelling of the lids and conjunctiva; intense chemosis; cornea ulcerated; opacities of the cornea. Gray spots and serpent-like bodies moving before vision. Blindness caused by mucus; must wipe away (euph., croc., puls.). Blurring of letters, with vanishing of vision when reading and writing. Lids red, thick, and swollen.

Clinical.—Time and again I have cured cases of purulent conjunctivitis with this remedy. It is the remedy that is used more than any other in ophthalmia neonatorum and in gonorrheal conjunctivitis.

In these cases, besides giving it internally, I use it

locally, but rarely stronger than ten grains of the first decimal trituration to the ounce of water; I do not think stronger solutions necessary unless in a case of gonorrheal conjunctivitis, when I use thirty grains to the ounce; but if you do not keep the eyes thoroughly cleansed, neither this nor any other remedy will do any good in these severe cases. In fact, I think as much, if not more, depends upon cleansing the eyes as upon the internal remedy.

It is recommended in failure of sight due to accommodative asthenopia.

It has improved vision in cases of atrophy of the optic nerve.

ARNICA.—Pain as if too dry and sore in margin of upper lid, along contact with ball, when the ball is moved. Inflammation of the eyes, with ecchymosis after injuries. retinal hemorrhages; promotes absorption of clots (crotal., lach., phos.). Traumatic muscular paralysis. Traumatic keratitis; also iritis.

Clinical.—I remember relieving one case with this drug when patient complained of that dry and sore feeling on margin of upper lid when moving eyeball. I have used it externally and internally to promote absorption of hemorrhages, and also to remove the soreness after any injury to the eye.

I have used it several times beneficially in traumatic mydriasis, accompanied by paresis of accommodation.

In a case of traumatic ulcer of the cornea, which was extending rapidly, and pus forming in the anterior chamber, this remedy acted like magic. It checked the breaking down process immediately, the pus was absorbed, and in a week's time patient was dismissed cured. This is the only case of many that I have had where I have seen a remedy check the destructive process after it had reached the stage that this had, without operative interference—that is, opening the anterior chamber. I had not tried *arnica* before in this class of cases, but have since, with great benefit.

After treating a case of traumatic iritis with different

remedies without result, I prescribed *arnica*, with immediate relief.

ARSENICUM.—Burning in eyes, with smarting, corrosive lachrymation, makes cheeks sore; also lids (euph., merc. c.); eyeballs hot and burning sore; œdema of lids (apis, rhus). Lids swollen, red, and excoriated. Pain in margins of lids during motion, as if they were dry and rubbed against eyeballs (*arnica*). Lids dry when reading by candle light, as if eyes were rubbed by them (sulph.). Burning in margin of upper lid. Conjunctiva red, injected, with diffuse pale redness. Conjunctivitis, with suffusion of eyes and photophobia. Feeling of sand in eyes (caust., hep. s., nat. m., sulph.). Photophobia, especially in sunlight. *Arsenicum* cases are generally relieved by warm applications. Pains are apt to be periodic in character.

Clinical.—I have frequently prescribed it beneficially in cases where there were phlyctenules, pustules, or ulcers of the cornea or conjunctiva, where, besides the above eye indications, there were the well-known general indications, such as thirst, restlessness, low condition of system, aggravations at night or after midnight. It is indicated in ciliary neuralgia, where there are the fine burning pains, especially aggravated after midnight.

In a recent case of rheumatic iritis, where there was marked chemosis of the conjunctiva, with burning in the eyes and lachrymation, some œdema of the lids, *arsenicum* relieved immediately, followed by a rapid cure. It is used in retinitis albuminurica, where there are the general indications for the drug, which are well known.

I have found it useful in catarrhal conjunctivitis, where there was the burning and excoriating lachrymation, some swelling of lids, and conjunctivæ; excoriating coryza.

I have also used it in some cases of conjunctivitis trachomatosa, with the above indications (nat., arsen.).

ARSEN. IOD.—Weakness of eyes, with burning pain and feeling as if lachrymation would set in. Burning in and around eyes.

Clinical.—I used it with relief and cure of a case of

herpes zoster frontalis, accompanied by a small ulcer of the cornea; giving it on the indication of the burning pains. In a recent case that I have had of ulcer of the cornea it cured in a few days. There were present the burning pains, with some swelling and redness of lids. In phlyctenules and pustules of the cornea, especially if there is a strumous diathesis, I have found it acts nicely; generally given on the arsenical symptoms.

ARUM TRIPHYL.—Much water in the eyes from morning till evening, especially in outer canthus, with swelling of margins of lids.

Clinical.—I have prescribed in several cases successfully, where there were phlyctenules of the cornea, accompanied by a nasal catarrh and discharge.

A case of catarrh of lachrymal sac, with a desire to bore into the side of the nose, is reported cured by it.

ASAFETIDA.—Periodical burning in the eyes with pressing together of lids as if overcome by sleep.

Burning in eyeballs from within outward; pressure on external margin of left orbit; pinching; drawing across supra-orbital region; orbital neuralgia, severe burning pains above orbits, throbbing at night > by pressure (aurum < by pressure); pains, boring from within out (aurum, boring from without in).

Clinical.—I have frequently prescribed it with quick and excellent results in kerato-iritis or in iritis alone, that was accompanied by the boring pain above the eyes. I think it is a remedy that should be used more frequently in these diseases than it is.

AURUM.—Pressive pain in right eyeball from above downward; pressive pain inward in right eyeball < during motion; pain deep in bone around eye from without in < by touch and pressure (asafet. the reverse); lids agglutinated in the morning; burning in the lids; burning in the inner canthi, with stitching, drawing, and itching; vision double (gels.) one object is seen mixed with another, with tension in eyes; half-sighted as if upper half of vision were covered with a dark body (gels.); vision indistinct, as

through a veil (caust., croc., hyos., nat. m., phos., petr., sep., thuja).

Clinical.—In conjunctivitis trachomatosa and pannus, accompanied by marked redness and inflammation of the conjunctiva, pain, photophobia, lachrymation, and vascular cornea. I have had some excellent results with this remedy ; in fact, I consider it one of our best remedies in the aggravated forms of this trouble.

In parenchymatous keratitis accompanied by the above indications, it is a most excellent remedy ; the special indications are the marked inflammatory symptoms of the conjunctiva, and the infiltration and vascular condition of the cornea (can. sativa—has a vascular condition of the cornea accompanying the infiltration, but there is very slight inflammation of the conjunctiva with it), (kal., mur. has a non-inflammatory and non-vascular infiltration of the cornea).

I have used it successfully in clearing up opacities of the vitreous in a case of serous cyclo-choroiditis, unaccompanied by punctated opacities on posterior surface of cornea.

It is used in iritis with severe pains in the bones, extending down into the face and nose, with great soreness all about the eye ; pains from without inward < by touch and pressure. It has been used in retinal diseases accompanied by hemiopia. This remedy follows well after over-dosing by mercury and potash. Indicated in syphilitic cases, especially hereditary.

BADIAGA.—Intermittent pain in posterior part of right eyeball, at 3 P. M. < afternoon in temple ; pain in eyeballs, extending into temples < by turning them in either direction ; soreness of left eyeball, even in closing it tightly ; bluish purple margins of lids and blueness under the eyes.

Clinical.—Neuralgia of eyeball. Has been used successfully in morbus Basedowii.

BAPTISIA.—Soreness of eyeballs (eupat. perf.), with lame feeling on moving them (actea, bry.).

Clinical.—Pain in eyes in low form of fevers.

BARYTA CARBONICA.—Mist before the eyes in the morning and after a meal ; weakness of sight with old age ; phlyctenules and ulcers of the cornea.

Clinical.—Has been used to retard growth of cataract. Have had no personal experience with it. Is recommended in scrofulous affections of the eye, but I prefer the baryta iod.

BARYTA IODIDE.—Indicated in phlyctenular and pustular keratitis where they are accompanied with enlarged cervical glands.

Clinical.—I have cured a case of parenchymatous keratitis which was accompanied with enlarged cervical glands. In phlyctenules and pustules I have used it with good results.

BELLADONNA.—Eyes staring. projecting and sparkling pupils dilated, immovable ; conjunctiva covered with red vessels, with shooting pain and lachrymation ; puffy appearance about the eyes ; eyes red, swollen and distorted ; dryness of the eyes ; on motion of eyes, dry and stiff sensation ; heat in eyes as if in hot vapor ; great intolerance of light ; optic disk deepened in tint, retinal arteries and veins enlarged ; vision dim ; double vision ; vision of sparks ; halo around candlelight, partly colored, red predominating (phos.—green predominating), at times occasional flashes of light ; chromopsia.

Clinical.—This remedy is recognized very often in external diseases of the eye. I have given it occasionally in iritis where there were the throbbing pains in the eye ; it is more frequently used in disease of the retina and optic nerves, generally dependent upon some intracranial disturbance, shown by the congestion of the vessels of the optic nerve and retina, accompanied by the well-known head indications.

BORAX.—Lashes turn inward toward eye and inflame it, especially at outer canthus, where the margins of lids are very sore ; inflammation of right outer canthi with irregularity of lashes, and nightly agglutination of eyes ; vision

of bright waves moving now from right to left, and now from above downward, mornings when writing.

Clinical.—It is indicated in blepharitis, accompanied by entropion; also trichiasis and granulated eyelids.

BRYONIA.—Burning in the right eye with lachrymation; intermittent pain in left eyeball < by moving eyeball, with feeling as if the eye became smaller and were retracted within the orbit; objects seem covered with rainbow color; eyes very sore and feel as if pressed out of head (spig.); eyeballs excessively painful < by touch; pain in the eyes sharp and severe; pass backward to occiput, < by moving the eyes.

Clinical.—I have frequently prescribed it on the pain in the eyes, sharp and severe, passing backward to occiput < by moving eyes, either in ciliary neuralgia accompanying iritis or the idiopathic form. It has been used successfully in disease of the uveal tract, especially in the serous forms.

TWO CASES OF TRUE DIPHTHERITIC CONJUNCTIVITIS.

BY F. H. BOYNTON, M. D., NEW YORK.

DURING twenty years' service at the New York Ophthalmic Hospital, but two cases of true conjunctivitis diphtheritica have fallen under my observation :

The first occurred in the spring of 1876, in a young man, eighteen years of age, who, after violent outdoor gymnastic exercise, became suddenly chilled from sitting on the damp ground, and the following day developed a conjunctivitis of one eye. When he applied for treatment there was much swelling and infiltration of the cellular tissue of the lids ; the skin was shining and bluish from stasis. The conjunctiva was bloodless and as if seared with a hot iron, resembling pork rind, from the constringency of the blood vessels due to the infiltrate. This condition was common to the conjunctiva covering both the superior and inferior tarsi, and later involved the bulbar conjunctiva. There was noticed a slight watery discharge, which, in the course of the week, became purulent and abundant. On the third day the second eye became involved and ran a similar course to the first. I had, notwithstanding the most diligent nursing and the advice of the entire staff of the hospital, the awful experience of witnessing the loss, by sloughing, of both corneæ and the patient rendered hopelessly blind.

This case was treated as an ordinary purulent conjunctivitis by the application of cold compresses, carbolic acid solutions, nitrate of silver as an astringent and a variety of internal remedies, but without avail so far as preserving the usefulness of the corneæ was concerned.

A border of cornea alone remained, through which iridectomies

were subsequently made, with recovery of sufficient vision to permit of finding his way around alone.

This was the confluent form of the disease which, by its general infiltration of the bulbar conjunctiva, so completely shut off nutrition from the cornea that, before the purulent stage could be established, necrotic death of the cornea ensued.

The second case was that of a little girl two and a half years of age, with an apparent croupous conjunctivitis of four days' standing, which, in the following forty-eight hours, assumed the swelling with the leathery feel and infiltration of the conjunctiva characteristic of diphtheria, covering the upper tarsus and finally extending to the small patch of bulbar conjunctiva above the cornea.

There was a slight watery discharge with coagulable lymph thrown out upon the surface of the tarsus. This was circumscribed diphtheritis.

Measures were taken to hasten the purulent stage and thus anticipate loss of corneal tissue by the application of flaxseed poultices, frequently changed, which was kept up continuously for nine days. A solution of mercuric chloride, 1 to 8000, was used every two hours to cleanse the conjunctival sac. *Kali bichromicum* 3c tablets every two hours was given internally.

On the tenth day the hardness of the lids and infiltration of the conjunctiva had disappeared and a mild, purulent discharge had been established, which rapidly disappeared. The use of *argentum nitricum* 6x served to control the discharge, and the case was discharged cured on February 6.

MATERIA MEDICA OF THE NOSE AND THROAT.

BY A. WORRALL PALMER, M. D., NEW YORK.

AT the beginning of this series of articles which I take pleasure in supplying at the request of the editor, it may be advisable to make a few explanations in order to understand them the better.

I have endeavored to include all symptoms occurring in diseases of the respiratory tract down *to* the bifurcation of the trachea, and *not* beyond it.

All symptoms appearing are either clinical and verified symptoms from good authorities, or have occurred in provers three or more times.

Clinical and verified symptoms are in italics, preceded by an asterisk, thus *.

This form or scheme, similar to that employed in the "Therapeutics of Diarrhœa," by Bell and Laird, has been selected, because the author has found that book so easy and convenient both for study and rapid reference.

ACONITUM NAPELLUS.

Nares.—(*Objective*).—**Inflammatory swelling, accompanying corpora adventia in nare.*

(*Subjective*.) Pain at base between orbits. (Ign. = and kali bi. = in bridge of nose.) Inspiration through nose impeded, < in sleep.

(*Discharge*).—Clear fluid flows from the nose. Fluent coryza. **Severe coryza with lachrymation.* (Cepa = acrid

coryza and bland lachrymation. Euph. = bland coryza and acrid lachrymation.)

(*Epistaxis*).—**Epistaxis caused by coughing*. Blows out bright red blood in mornings. (Bell. = morning hemorrhage. Bry. and kali c. = morning on washing. Millifolium = bright hemorrhage, but *not* anxious or restless. Cinnamon = continuous slight oozing. Ham., sec. c., phos., and croc. = dark blood.) **Epistaxis with pain in upper part of eyes*. **Epistaxis from effects of sun*. (Glon. =).

(*Olfaction*).—**Great sensibility of olfactory nerves*. (Bell. = tobacco and soot especially intolerable. Graph. = acute; can't bear smell of flowers.) Bad smells have powerful effect.

Naso-Pharynx and Pharynx.—(*Objective*).—Redness of soft palate, faucial pillars, tonsils, and uvula. Tonsils swollen, red, with arborescently injected dark red fauces and pharynx.

(*Subjective*).—Drawing in muscles. Stitches at back part, causing frequent swallowing. Pain < on deglutition. Raw, scraping feeling in back part with desire to hawk (bry. = dry and raw on empty swallowing. Hepar. s. c. = scraping, impeding speech but not swallowing. Phos. = rawness and scraping < toward night). Scraping in throat and soft palate with burning as from peppermint. Burning at back of throat (caps. = burning between the acts of deglutition. Canth. = burning on deglutition, extending downward). Dryness with irritation to cough, as if something stuck in throat. Throat seemed to swell. Burning in soft palate. Dryness of soft palate, palate and posterior nares. Constriction in soft palate and uvula with scratching, causing hawking, spitting, and nausea.

Larynx and Trachea.—(*Objective*).—**Aphonia caused by fright, anger, indignation, or violent emotion*. Voice weak. *Hoarseness*. (Bell. = especially when crying. Iod. = voice jerky < in morning.) **Suspected croup with dry high fever, anxiety and restlessness*. Aphonia. (Ant. crud. = from becoming heated. Arum triph., phos., and

Spong. = from vocal exertion. Gels. = during menses.
Opi. from fright or fever.)

(*Subjective*).—Pain in larynx on coughing (osmium = scraping and constriction on coughing). Sensitive to inspired air. Tickling, provoking cough. (Rumex and sang. = extending beneath sternum.)

(*Discharge or Expectoration*).—Bloody. Of blood and mucus with raw feeling behind sternum (arn. = bright red, frothy blood and mucus with tickling under sternum). Rusty (phos. = later stage of disease). Thin, frothy, with mucus, with streaks of bright red blood (sulph. = sweetish taste).

(*Cough*).—Cough with blood-streaked expectoration (sulph. =). Cough disturbs night's rest. Violent c. with shooting in different parts of chest. (Bry. = principally left side. Kali c. and phos. = right sided.) Dry c. from irritation in larynx. (Puls. = c. caused by tickling, scraping, accompanied by lachrymation.) **Hoarse ringing c. with pain in larynx and anxiety* (brom. = c., principally of neurotic origin. Iod. = feverish but quieter. Spong. =). Short dry c. from scratching in larynx. Frequent c. with expectoration of bright red blood. **Hard, dry barking c. with loud expiration.*

Characteristics or Concomitants.—Indicated in persons of plethoric habit or sanguine temperament. In acute stage of disease. In diseases of congestive and inflammatory character. Pulse is bounding, fever is high, skin burning, face red, and *great anxiety*.

Great anxiety and restlessness with fever. Fear of death. Sadness. Vertigo on rising from recumbent position.

Headache as if brain were agitated with boiling water. Fullness in head as if everything would come out of the forehead.

Eyes sparkling.

Face and cheeks red and hot with feeling as if face were becoming large.

Mouth, tongue, and lips dry. **Thirst for cold water*, everything except water tastes bitter.

Anxious desire to urinate. **Urine scanty, red, hot* (feverish urine), *but frequent*, with *coryza*.

Congestion of blood to chest, early stages. Breath hot. Shortness of breath, especially when sleeping. Sensation as if lungs would not expand. Palpitation of heart with great anxiety, with quick, hard pulse.

Bruised pain in small of back. Numbness in back or left arm.

Sudden sinking of strength.

Sleeplessness, with constant tossing about. Dreams anxious. Awake with start.

General dry heat.

ALUMINA.

Nares.—(*Objective*).—Swelling of left wing with hardness and pain.

Swelling of septum (caust. = swollen in A. M. > in evening), with redness and pain on touch, pain < in evening. **Nostrils ulcerated in scrofulous subjects*. Scabs in, and thick yellowish discharge from, right nostril with soreness (graph., discharge offensive and mixed with blood). Obstruction.

**Ozena in scrofulous subjects*. **Scurfy and sore*.

(*Subjective*).—Obstruction. Very sore internally.

(*Discharge*).—Thick yellow discharge from, and scabs in, right nostril, with soreness (graph.). Discharge of hard lumps of mucus. **Thick mucous discharges into the throat*. **Nasal discharge alternates with leucorrhœa*. **Thick, greenish-yellow, bloody mucus from nares*.

(*Objective*).—**Anosmia*. **Parosmia*.

Naso-Pharynx and Pharynx.—(*Objective*).—Inflammatory redness of back of pharynx (arg. m.). Thick viscid mucus < in evening and morning on waking. **Pharynx dark red, follicular and relaxed*. **Mucus in opening of eustachian tube*. **Redness of mucous membrane in clergyman's sore throat*.

(*Subjective*).—Shooting here and there, in evening and sometimes on swallowing, something sharp seems to stick

in throat (nitr. ac., stitches also in talking or coughing, hepar s. c., stitches on deglutition). **Sensation of splinter.* Pressure in pharynx as from lump, with soreness, rough voice, and dry throat. Soreness after difficult clearing. Soreness on swallowing. Scraping in naso-pharynx. Roughness, causing hawking, evening and night, with accumulation of mucus. *Dryness* at night or *evening*, inducing frequent clearings (baryta c., zinc) with scraping. Tickling, causing cough. **Dry, especially on waking.* **Sensation of tightly adhering phlegm which cannot be raised* (merc., iod., rumex).

Larynx and Trachea.—(*Objective*).—**Hoarseness, Voice is husky, thick, with post-nasal dropping of thick mucus.*

(*Subjective*).—Irritation in larynx, inducing cough (brom., scraping and rawness causing cough. Iod., tightness and constriction causing cough. Phos., violent tickling when speaking, causing cough).

(*Cough*).—C. caused by irritation in laryngeal region < in morning (ammon. c. = incessant cough excited by a sensation of down in the larynx < morning, especially from 3 to 4 A. M.). Dry c. at night (acon. = dry tickling, annoying night c.). Continual dry hacking, with vomiting and arrest of breathing. Fatiguing c. with much expectoration < in morning (kreos., fatiguing morning c. of old people). **C. caused by talking or singing* (bry., phos., and merc. s.).

Characteristics and Concomitants.—Chlorotic temperament with morbid appetite. Mild disposition; dark complexion, spare habit, and advanced in years.

Anxious. Assurance alternating with timidity. **Aprosexia*, mind sluggish.

Vertigo as soon as open eyes. Dullness of head with loss of memory. Headache while lying quietly. **Dullness of hearing and cracking in ears on swallowing, accompanying naso-pharyngeal catarrh.*

Tension of face as if white of egg had dried upon it.

Desire for indigestible articles, *e. g.* chalk, starch, slate pencils, charcoal, etc.

Sensation of constriction of the esophagus when swallow-

lowing, food felt till it reaches stomach. Can swallow but small morsels of food at a time.

Faintness in stomach with vertigo, rectum seems paralyzed, straining to pass even soft stool.

Oppression of chest at night.

Lack of animal heat. Debility and weakness, especially when talking.

Dreams of thieves. Awakes with palpitation of heart.

General dryness of skin.

APIS MELLIFICA.

Nares.—(*Discharge*). Coryza, with dread of cold, but < by warmth.

Naso-pharynx and Pharynx.—(*Objective*).—**Mucous membrane and subjacent cellular tissue swollen and œdematous, of water-logged appearance, either with or without congestion.* **Uvula swollen like bag of water.* **Tonsils red and swollen.* Swelling, with hoarseness, difficulty in swallowing on account of irritability of epiglottis, and with white spot on glottis. Dryness with heat (bell. = dryness and stiffness hindering swallowing, *not* > by drinking, but *is* > temporarily by sugar. Æsc. h. = dryness, with constriction < after eating). **Pharynx shiny, puffed, as if varnished.* **Erysipelas beginning on tonsil and palate extending to larynx.* **Cluster of vesicles on posterior wall of pharynx, in erysipelas.* **Quinsy, principally left-sided, superficial tissues most involved* (bell. affects the parenchyma). **Deep ulceration of lacunæ of tonsils, follicular exudation resembling pseudo-membrane.* **Diphtheria, with prostration from very beginning, membrane first appearing on uvula and fauces is dirty gray and like thick chamois skin, most on right tonsil, which is studded with deep gray, angry-looking ulcers.* (Lac. can., kali bi., and phyto., grayish membrane). **Almost a specific in first stage of diphtheria.* Very beneficial as a prophylactic used in 3d cent. dil., a dose four times daily. (Edematous throat, with rash on hard palate, stinging pains on attempted swallowing, without thirst in suspected scarlet fever.

(*Subjective*).—At the commencement of soreness of throat have coldness of tip of nose. **Constriction, with sensation of a foreign body in it and dysphagia and painful respiration.* (lach., sense of plug in throat, which is very sensitive to touch). Deep-seated, stinging itching at lower part of neck, with constriction. **Burning, stinging pains.* **Pains in diphtheria are comparatively slight for the accompanying intensity and extension of inflammation.* **Stinging, extending to ears, on swallowing* (nitr. ac., and hepar s.).

Larynx and Trachea.—(*Objective*).—*Œdematous swelling of mucous membrane, of sudden onset or accompanying traumatic conditions.* **Œdema of glottis.* **Erysipelas of larynx.*

(*Subjective*).—**Hoarseness.* **Sensation as if could not breathe again* (agar. m. and amyl. nit. Sense of suffocation, but no œdema). *Suffocation, with inability to bear anything around the throat* (lach. has the same even more marked).

(*Discharge or Expectoration*).—Expectoration of copious, transparent, frothy, bloody mucus.

(*Cough*).—Severe c. before midnight, < after lying down and sleeping (phos. hollow c. during sleep unknown to patient; c. < after sleep). **Short, dry, spasmodic c. from irritation in supra-sternal fossa* (rumex cannot c. down far enough to raise the mucus and < by cold). **C. caused by touching pomum Adami* (lach.). C. < in warm room and > out of doors.

Characteristics and Concomitants.—Nervous, bilious temperament. Girls who, though generally careful, become awkward and let things fall while handling them.

Absentminded, indifferent, lachrymose, jealous, tending to inflammation of covering of the brain.

Headache, with vertigo; < sitting, and especially lying; > walking in open air. Brain feels tired.

Eyelids swollen, red, and œdematous; bag-like swelling under the eyes.

**Œdematous swelling of face and neck, accompanying diphtheria, and other severe inflammations of throat.*

Dryness of mouth and throat *without thirst*, mucous membrane of gums and cheeks swollen, with stinging pains; gums bleed easily, fiery redness of buccal cavity, tongue swollen, dry, and sore.

Abdomen sensitive.

**Painful micturition, urine scanty, albuminous, and dark;* frequent desire, oppression of chest, shortness of breath, rapid and painful respiration, especially when ascending, and when lying down.

Œdema of portions of body and extremities. **Periodical cutting, darting pains in shoulders and neck during diphtheria, and following it, weakness of hands and feet, even paralysis, nervous restlessness, great prostration and depression;* extreme drowsiness; screams during sleep.

**Stinging, itching eruption with diphtheria.*

ARGENTUM NITRICUM.

Nares.—(*Objective*).—**Ulcers covered with yellow crusts, accompanied with bloody and purulent discharge in ozena.* (Aur. met., mur., nitr. ac., and thuja.)

(*Subjective*).—Itching in nostrils (kali c. burning, itching in nose); sneezing.

(*Discharge*).—*Discharge of white pus, with clots of blood;* coryza, with chilliness; sick look; lachrymation, sneezing, and stupefying headache, obliging patient to lie down in afternoon (puls., coryza, with chilliness).

(*Epistaxis*).—Nasal hemorrhage.

(*Olfaction*).—Sense of smell dull (calc. c., and alumina).

**Anosmia* (hyos., natr. mur., nux v., and sang.).

Naso-Pharynx and Pharynx.—(*Objective*).—Redness of velum palati, posterior nares, and isthmus; *dark redness of uvula and fauces.* **Thick, tenacious mucus in pharynx and naso-pharynx,* hawked up easily; also causing hoarseness. **Early stage of atrophic pharyngitis.* **Post-nasal discharge profuse.*

(*Subjective*).—Ulcerative pain in right side of throat, with drawing and tension upward and downward; *sensation of a splinter when swallowing,* eructating, stretching and mov-

ing neck, and sometimes undulating and pulsating pain (nitr. ac., sticking pain in throat on long talking and coughing). **Rawness and soreness* (hydras.), roughness; scraping, causing hawking and coughing. **Catarrh of smokers, with sensation of hair, causing cough, again > by smoking.*

(Discharge).—**Easily dislodged yellow, thick, and apparently tenacious mucus*; mucus in posterior nares, obliging patient to hawk, especially in forenoon (nitr. ac., kali bi., merc. prot., hydras. m., and sepia).

Larynx and Trachea.—(*Objective*).—Inflammation and swelling of posterior wall and lining of larynx, with clog in larynx, etc. **Inflammation of larynx*, chronic in singers.

(*Subjective*).—Soreness in larynx < in morning also in pit of throat; **hoarseness and loss of voice, sensation of clog in larynx*; *dysphagia*; *continual and vain effort to swallow.*

(Discharge or Expectoration).—*Much hawking with mucopurulent expectoration.* Chronic catarrh of trachea.

(Cough).—C. in evening < by tobacco smoke (ignatia, acon., puls., and spongia, < by tobacco smoke). Suffocative c. at noon for several days. **Titillation in larynx causing dry spasmodic c.* C. caused by raising the voice.

Characteristics and Concomitants.—Impulsive; feels as if obliged to do something in a hurry.

Vertigo in morning with headache; vertigo with buzzing in ears.

Sickly, yellow, dirty appearance of face. Tip of tongue red and painful, papillæ erect and prominent.

Borborygmi after each meal; painful swelling of pit of stomach; darting pains through stomach and abdomen, gastralgia after ice cream.

Frequent evacuation of fetid, greenish mucus with noisy emission of flatus. Stitching pain in region of fifth rib, left side, with frequent blood spitting. Induration of cervical glands, with suspicion of former syphilis; nightly pains in back, great debility, and weariness of lower extremities. Lassitude, weariness, and tremulous weakness.

ARSENICUM ALBUM.

Nares.—(*Objective*).—Swollen and pouring forth a watery discharge. Lupus of nose has been benefited by ars. Reduces size of papillomata. **Dark red swelling accompanying adenoid vegetations.*

(*Subjective*).—Soreness of mucous membrane; pain in bone at root; *burning, stinging pain in cancer; dryness; stoppage as from catarrh; distressing stoppage under bridge (ipéc., catarrh, loss of smell, nausea, epistaxis, and stoppage of nose. Lyco., stoppage especially at root; gels., fullness at root with pain extending to neck and clavicles). Violent sneezing, waking at night with a copious watery discharge; sneezing on going into open air (cepa, sneezing on going into warm air). **Hay fever; *ulcers of right ala.*

(*Discharge*).—Watery discharge with swelling of nose; coryza with hoarseness and sleeplessness; fluent and dry coryza together; **fluent coryza with frequent sneezing* and headache waking at night (sang. c.); discharge every day, beginning at 5 A. M., > in hot weather; < in morning, disappearing in open air; excoriating discharge; watery and excoriating discharge (merc. s., corrosive, but thicker; cepa, profuse acrid watery nasal discharge with bland lachrymation; euph., bland nasal discharge with acrid lachrymation). **Relieved ichorous, sanious, fetid, excoriating discharge accompanying cancer; thin, excoriating diphtheritic discharge.*

(*Epistaxis*).—Nose bleed.

(*Olfaction*).—Perverted smell.

Naso-Pharynx and Pharynx.—(*Objective*).—Ulceration; inflammation and swelling externally and internally about root of tongue; **paralytic condition of pharynx, etc.; *marked œdema and even gangrene in erysipelas; *tonsils dark red, swollen and gangrenous; *vesicles in pharynx; *uvula œdematous* (apis, caps.); water or angiomatous tumors of uvula relieved; **diphtheritic membrane dark, dry and wrinkled, swelling internally and externally; *adenoid vegetations, hypertrophy extending to eustachian orifice.*

(*Subjective*).—Constriction (lyco., caps.). Dryness with soreness, scraping and burning; **burning in pharynx*, esophagus and stomach in erysipelas (arum c., nitr. ac.); swallowing difficult and painful (lach., painful lump in throat on swallowing); **paralytic condition of pharynx* and esophagus; *the fluid fell with difficulty and rumbling noise*, post diphtheria; **fetor from throat in diphtheria* (merc. cyan., excessive fetor; carb. ac., kali perm.).

(*Discharge*).—**Dark, offensive, ichorous discharge with burning pains in malignant disease* (aur. met., same in malignant disease of nares).

Larynx and Trachea.—(*Objective*).—**Laryngeal mucous membrane dirty red or anæmic; puffy, bluish red patches; *abrasion or superficial ulceration; *follicles enlarged, exuding gray mucus*; laryngeal papilloma are diminished by ars.; relieves effects of wounds of larynx; **œdema of larynx with predisposition to anascarca, or due to chronic disease, broken down constitution, or cardiac, aortic, or renal disease; *serous infiltration in perichondritis or condritis laryngis*.

(*Subjective*).—Air passages seem constricted (acon., apis, bell., brom., calc. c.); larynx dry; hoarseness on waking with pain in chest; voice trembling; voice uneven, now strong, now weak; breath lost in evening on getting into bed, with constriction of trachea and wheezing in it like the sound of a fine string; **burning in larynx < by deglutition; *voice husky and toneless; *fatigue from speaking*; relieves lupus of larynx.

(*Discharge or Expectoration*).—Spitting of blood; acid sero-purulent discharge from larynx during phthisis.

(*Cough*).—C. in evening directly after lying down (drös. and phos., puls., on becoming warm in bed); c. evening after lying, has to sit up, then contractive pain in epigastric region and pit of stomach. This pain continued the c., which made patient weak; c. evenings before sleep from a smoky sensation in larynx as from sulphur fumes; c. at night, compelling patient to sit up (con., hyos.); fits of c. wake him at night as if he would suffocate, and throat becomes swollen (lach.); c. when going into cold air (kali c.,

phos., dulc.); c. caused by tickling in larynx (brom., rumex); c. caused by constrictive sensation in upper part of larynx, as from sulphur fumes; c. < after drinking (phos.); spasmodic c.

Concomitant Symptoms.—Neurotic temperament, sad, irritable dispositions; anæmic, surface circulation both of skin and mucous membrane poor; acts best in catarrhal diseases based upon malarial miasm or in persons having faulty assimilation.

**Excessive anxiety and restlessness, driving patient to and fro in day time and from bed to bed at night; thinks his case hopeless.*

Starting on falling to sleep; *sleeps poorly after midnight with restlessness.*

Pain in forehead and over root of nose; periodic cephalalgia.

Œdema of eyelids; corrosive tears making the eyelids and cheeks sore.

Face puffed and blue, œdematous swelling of face; pale, yellow cachectic appearance; sunken face; white, waxy appearance of the skin.

Mouth dry; root of tongue swollen; *tongue brown, dry; burning; dry and morbidly red with papillæ considerably raised at tip; lead colored; edge of tongue red, receives imprints of teeth. Thirst for cold water,* which causes load in stomach; *drinks often but little at a time and vomits it immediately; drinking does not satisfy; aversion to food.*

Vomiting immediately after eating or drinking; heat and burning in stomach and pit of stomach.

**Urination frequent but scanty. Albuminuria in diphtheria.*

**Limbs weak and exhausted; uneasiness of lower limbs, can't keep them still.*

Dry, scaly, irritable burning eruption temporarily ameliorated by water.

Aggravation from cold, amelioration from warmth; aggravation after midnight. Bad effects of tobacco chewing.

ARSENICUM IODATUM.

Nares.—(*Objective*).—Dryness and stoppage with hawking; *nose swollen; *ozena*.

(*Subjective*).—*Burning and itching of all mucous membrane in hay fever.

(*Discharge*).—Burning, acrid coryza (*arum trip.*, *cepa*); catarrh with burning sensation in tubercular diathesis; **excoriating discharge in hay fever*.

Naso - Pharynx and Pharynx.—(*Objective*).—*Tonsils enlarged and naso-pharyngeal membrane thickened with *ozena of nares*; *glandular hypertrophies even to the follicles of pharynx; *atrophic and anæmic condition of mucous membrane; *gangrenous sore throat; **scirrhus tonsils in phlegmatic persons, also hypertrophy of Luschka's tonsils*. It has diminished tubercular ulceration of epiglottis. Beneficial in later stages of diphtheria with putrifaction.

(*Subjective*).—Burning rawness and soreness.

(*Discharge*).—In morning after moving about, hawking up thick mucus mixed with clotted blood which seemed to come from the head, and > the pain.

*Profuse thick yellow discharge in *ozena*; *much hawking.

Larynx and Trachea.—(*Objective*).—Anæmic puffy swelling of arytenoid prominences preceding tubercular ulceration; tubercular ulceration of larynx; **peri-chondritis and chondritis with great prostration but less swelling than ars.; diphtheritic croup*.

(*Subjective*).—Hacking with dryness and stoppage of nostrils; *burning accompanying *ozena*; *itching and burning in hay fever; spasms of larynx with restlessness, sore mouth, vomiting, diarrhea, and skin easily chafed (*brom.*, *cupr.*).

Characteristics and Concomitants.—Adapted to the tuberculous and strumous diathesis. Persons who are very delicate and anæmic.

*Tinnitus aurium accompanying follicular pharyngitis.

*Face is pale with prostration in hay fever.

*Veil of palate, roof of mouth, and all mucous membrane

very anæmic, frequently with interlacing of small injected blood vessels.

Appetite at first increased, later lost ; pain in epigastrium, with thirst, dry throat, fever, and sometimes diarrhea and tenesmus.

Hardness and distention of abdomen from flatus. Diarrhea, mushy stools. The urging begins on moving about in the morning.

Pulmonary tuberculosis ; pneumonia.

Nervous system very irritable, weariness of whole body with heaviness of limbs ; great debility ; cachectic condition.

Sleep restless ; night sweats.

AURUM METALLICUM.

Nares.—(*Objective*).—*Nostrils ulcerated, agglutinated* (nitr. ac., arg. nit., and thuja ; phos., without sharp pains) and painful, so patient cannot breathe through nose ; swelling of right nostril and beneath it with redness ; swelling on coming into house after walking in open air ; swelling of both nostrils, with redness. **Ulcerations deep, edge well defined.* **Caries of nasal and palate bones ; sinking of bridge of nose.* **Obstruction.*

(*Subjective*).—Sore feeling internally, < by touch (graph., soreness, with dry scurfy condition) ; **right nasal bone and adjoining nasal process of superior maxillary, painful to touch* (merc. s.) ; appears obstructed, although air passes through it. **Burning in nostril with itching, sticking, and smarting* (nitr. ac.) ; crusts in nostrils (kali bi., hepar s., and aur. mur.) ; crusts in right nostril as from ulcers. **Very offensive odor from nose.*

(*Discharge*).—**Fetid, yellow, and thick ;* in cancerous condition, putrid, ichorous, greenish pus, with bruised, shooting, drawing pains.

(*Olfaction*).—**Smell acute* (graph., acon. and bel.) **Putrid smell in nose when blowing it* (kali bi.).

Naso-Pharynx and Pharynx.—(*Subjective*).—Stitches in

throat when swallowing (nitr. ac., hepar s., and ign., when not swallowing).

Larynx and Trachea.—(*Subjective.*) Dyspnœa (apis mel., ars., kali iod., and sang. can., phos., dyspnœa worse morning and evening; great pressure upon sternum); dyspnœa at night; dyspnœa, with stitches in chest when inspiring; patient constantly takes deep breath and cannot inspire air enough; frequent deep breathing; stitches in sternum.

Characteristics and Concomitants.—Adapted to syphilitic and scrofulous diathesis; also persons who have been mercurialized; temperament sanguine; complexion muddy; indicated in old age. Melancholic, dependent; imagines himself unfit for life, and *mind constantly turned toward destruction of life*; weary of life; has no confidence in self; mental labor fatigues; *least contradiction excites wrath*.

Half-sighted; sees only upper half of object; skin of face bloated and greasy-looking; putrid taste between meals; ulcers on tongue.

Nightly diarrhea, with burning in rectum.

Thick, white, acrid leucorrhœa, burning vulva.

Sensation as if heart ceased beating, and then all at once a hard thump is felt; pain in gland under angle of jaw; bruised pain in parotid gland on touch; hysterical spasms; great nervous weakness; sleep disturbed by dreams of thieves.

The metal has greater affinity for bony tissue, the muriate for cartilaginous.

BELLADONNA.

Nares.—(*Objective.*)—Sudden redness of tip with burning; dryness of Schneiderian membrane, also of eyes with burning in them and in lids; **erysipelatous redness of nose with chilliness*.

(*Subjective.*)—Nares feel dry, accompanied with dryness and burning of eyes and lids (nux. v.); prolonged attacks of sneezing; frequent dry sneezing with tickling, especially

in left nostril (asa., mer., dry coryza, especially in the left nostril; violent sneezing); **frequent sneezing, causing headache*; **hyperæsthesia of nasal mucous membrane*.

(*Discharge*).—Catarrh or cough, with coryza; blowing out of mucus mixed with blood (alum.); **acid, watery nasal discharge* (cepa).

(*Epistaxis*).—Epistaxis with congestion and full throbbing headache (acon., copious epistaxis with fullness of head; erigeron, epistaxis with rush of blood to the head, red face, and fever).

(*Olfaction*).—Olfactory sense very sensitive; (acon., aur. met., and graph.); smell of tobacco and soot is intolerable; **perverted smell*.

Naso-Pharynx and Pharynx.—(*Objective*).—**Tonsils red and inflamed*; **glands in and around throat swollen, making opening of mouth painful*; **pharynx bright red or dark cherry red, and shining as if varnished*; **œdema of epiglottis and ary-epiglottic fold and mucous membrane deep purple, almost black, in putrid sore throat*; beneficial in chorea of soft palate; **uvula red and swollen*.

(*Subjective*).—Shootings on swallowing and breathing; shooting in pharynx on turning head and feeling of pressure on side of neck with pain as from internal swelling; scraping from dry hawking; soreness extending to ears after reading aloud, with redness about the tonsils and palate (gels.); **anterior cervical glands swollen and tender, even preceding sore throat*; constriction in throat alone or extending to stomach; *feeling as if too narrow when swallowing*; dryness; **dryness with difficult swallowing* (duboisia); **dryness, hindering swallowing and altering voice*; **dryness causing constant attempts to swallow, then at every attempt, suffocative spasms of fauces and glottis*; burning (with natural moisture in mouth); not > by drinking, but transiently > by sugar; swallowing difficult (act. rac., tellur., soreness on empty swallowing); swallowing of water difficult (merc. ¹/_s., difficult deglutition, especially of drinks, which return by nostrils); swallowing of solids only possible by constantly taking liquids (baptisia, can swal-

low liquids only, the least solid food gags); **swallowing difficult and painful*; **swallows only a few drops, the rest being forced out through nose by spasmodic action of muscles of deglutition* (lach., substances forcibly regurgitated through nares, on account of paralysis of muscles); **heavy pain in throat*.

(Discharge).—Profuse expectoration of light mucus as soon as throat begins to feel sore.

Larynx and Trachea.—(Objective).—**Ædematous swelling of lining of larynx, with sudden onset*.

(Subjective).—**Constriction or spasm of larynx*; **painful dryness of larynx*, with aversion to all drinks; dryness of larynx, making voice husky and often inducing dry cough; *hoarseness* (acon., phos., spongia), especially when crying; hoarseness with dryness, with frequent cough, and frequent necessity for empty swallowing, and when swallowing pain in larynx, extending to left ear (lach., hepar s.); voice weak; **aphonia*, confused sounds uttered with pain; respiration difficult; respiration short, after coffee in afternoon; respiration rapid and oppressed; **sawing, whistling respiration in croup with midnight <*; **tickling in supra-sternal fossa causing cough* (rumex cr.)

(Cough).—Cough beginning at 10 P. M., recurring every quarter of an hour or oftener in three or four fits at a time; c. preceded by crying (arn.); c. with bloody taste in mouth; violent cough in sleep with grinding of teeth; dry c. from scraping in larynx; short c. in evening in bed from itching tickling in back of larynx; **croupy, barking cough*.

Characteristics and Concomitants.—Indicated in plethoric and lymphatic constitutions; those jovial when well, but very irritable when sick.

Fantastic illusions of intellect; merry craziness; violent weeping, moaning and shouting; over-excitability of all senses.

Head confused; hot head with cold hands and feet; violent throbbing headache; rush of blood to head; stabbing from one temple to the other; headache < by noise, motion, and moving eyes; carotids throbbing.

Double vision ; sparks before eyes.

Tearing shooting from ear to throat.

Face red and puffed ; spasmodic action of facial muscles.

Mucous membrane of mouth deep red ; tongue dry, papillæ raised.

Nausea ; vomiting of bile and mucus.

Abdominal pains transient ; pain in abdomen as if clutched with hand.

Involuntary stools ; constipation ; stools in lumps like chalk.

Urine yellow ; frequent desire.

Fullness and downward pressure in uterine region.

Oppression of chest ; trembling of heart.

**Neck stiff.*

Intense cramps and pain in os coccyx ; tearing pressure in shoulder ; **anterior cervical glands swollen and tender, even preceding soreness of throat.*

Convulsive movements, especially of flexor tendons ; **hyperæsthesia of all the special senses.*

Sleepiness, but unable to sleep ; on going to sleep is awakened by shock from below upward ; singing, shouting, and tossing in sleep.

Dry fever, with hot, congested face and head.

Pains, etc., come suddenly, last indefinitely, and cease as suddenly.

THE SPINAL CORD AS A FACTOR IN OPTIC NEURITIS.

BY E. G. RUST, M. D., WELLINGTON, OHIO.

THE necessity of a rigid examination of the spine in all cases of optic neuritis is essential to an accurate prognosis. While pathological lesions of the spinal cord are but one of a series of conditions which may manifest themselves by the ophthalmoscopic appearances of the optic disk, they are of primary importance.

The post-neuritic atrophy, when not the result of independent affections of the nerve, embolism of the central artery, cerebral or other pressure, is often a premonitory symptom of sclerosis or other lesions of the cord.

In *tabes dorsalis* the abnormal condition of the optic nerve is to be expected, likewise in multiple sclerosis.

But these are not the cases which consult the oculist. The cases which come to him are those where the impaired function of the optic nerve is the only apparent symptom of disease. It is to these cases that reference is made, and it is here that the early discerning of any latent spinal affection makes the spinal cord of such intrinsic importance. Of a number of cases referable directly to the spinal cord, I have selected from my records the following :

Mrs. Mabel H., white, age twenty-seven. For several weeks before consulting me had gradually noticed vision becoming dim. Disease progressed rapidly, patient becoming unable to see any object distinctly, to walk or feed herself, muscular co-ordination lost, almost entire absence of patellar reflex. Treatment entirely

directed to the spine. Actual cautery applied, strychnia and atropia internally.

Result, recovery in two years.

Mrs. T. W., consulted in reference to having glasses fitted to relieve sight. Examination showed progressive atrophy of optic nerve.

Patient had spinal paralysis six months previous, but had substantially recovered. In this case no treatment was of any aid. Nerve atrophy rapidly progressed, patient becoming totally blind. Died four months later of myelitis.

Mr. W. A., American, age forty-five. Had been for six months, and was at time of consultation, under the treatment of a prominent old school oculist for optic neuritis in right eye. Left eye amblyopic from birth. Affected eye steadily growing worse. Subjective symptoms and ophthalmoscopic appearances denoting approaching post-neuritic atrophy. Percussion of the spine indicated tender areas, patellar reflex entirely wanting. Diagnosis, neuritis-optica with coming atrophy, reflex from the spinal cord. Case under treatment one year, during which time I cauterized spine with actual cautery at intervals of from five to fifteen days. Internally, strychnia at commencement, and later tinct. of conium.

The case made a perfect recovery. Had the optic trouble been treated as a primary instead of a secondary affection, amaurosis must have been inevitable. The action of conium in clearing the haziness of vision in this case was, indeed, brilliant.

A CASE OF MELANO-SARCOMA OF THE CHOROID.

BY CHAS. C. BOYLE, M. D., NEW YORK.

ON November 24, 1894, a boy nine years of age, who had been struck on the left eye by a piece of coal, came to me to be treated for the injury, which consisted of a wound of the cornea, from which the iris had prolapsed. There was very little pain or redness. After treating him for nine days I advised him to enter the Ophthalmic Hospital so that I could remove the piece of iris that protruded; this was done, and in four days he was dismissed, his eye being well, and in a normal condition with the exception of an adhesion of the iris to the corneal wound, which caused a displacement of the pupil. At this time, which was about two weeks after the injury, I examined the interior of the eye with the ophthalmoscope, and found it normal with the exception that in the space between the optic nerve and macula lutea I discovered a whitish patch with darker border, which I concluded was due to a partial rupture of the choroid, and the remains of a hemorrhage. Vision was poor, $\frac{20}{200}$; tension of this eye was slightly diminished. Two weeks after this he returned with the eye in the active stage of panophthalmitis, and I saw at once that it was lost. He gave a history of going to bed with the eye feeling well and sight improving, but was awakened with a sharp pain in it, and from that time the organ rapidly became inflamed and swollen. He said he had put his finger into his eye, but that did not seem to me to be a satisfactory explanation of the severe

inflammation that he had. As he would not come into the hospital, and he lived in Brooklyn, I turned him over to Dr. Warner, of that city, to be treated at his home. I explained to the parents that nothing could save the eye, and that all that could be done was to treat the inflammation until it had subsided.

On December 29, 1894, one month and five days from time of injury, he returned to me, and I found that the right eye had a slight attack of iritis, which I diagnosed as due to sympathetic irritation from the other eye, which at this time was a very innocent-looking atrophied stump with hardly any redness or tenderness. I advised the immediate removal of this eyeball as the only means of saving the other eye, but did not obtain consent until the next day, at which time I removed it, and was very much surprised on cutting it open to find it filled by a hard brownish-black mass, which I diagnosed as a melano-sarcoma. The pupil of the other eye was kept dilated and the inflammation subsided, and on January 6, 1895, patient went home. Since then he has had some slight irritation of the remaining eye, but this I think is due to carelessness more than anything else; it rapidly disappears under treatment. Vision in this eye is $\frac{20}{40}$.

The most interesting point of this case is the rapidity of growth of this tumor; we know almost exactly when it commenced; there were no signs of it in the eye the first part of the second week in December, and it was removed December 30.

These tumors are very rare in children and not very frequent in adults, and their growth is generally slow, but when occurring after an injury, as this did, they are apt to be rapid. The sympathetic irritation of the other eye, which called for the removal of the atrophied eyeball, may possibly be the means of saving the patient's life, as the removal of this malignant growth may have taken place before it had invaded the optic nerve and through this infected the brain, which course it generally follows; time will tell. At the present time the empty orbit shows no

signs of any return of the growth. The following is Dr. G. F. Laidlaw's report after examination of the eyeball: "I find a globular tumor completely filling the eyeball, involving the choroid coat, and covered by the sclerotic. The tumor is white in color, except for rather less than one-eighth inch depth at the periphery, where the color is bluish black or gray. On section and microscopical examination the growth proves to be a melanotic sarcoma of the small round-celled type, and I need hardly add, one of the most malignant of tumors, in recurring locally and in rapid infection of other organs of the body."

THE CEREBRAL CENTERS OF VISION AND THE INTRA-CEREBRAL VISUAL NERVOUS APPARATUS.

BY M. LE DOCTEUR VIALET, PARIS, FRANCE.

(Concluded from page 66.)

IN a horizontal section (Fig. 4), the external layer appears as a deep line (*Fli*) clearly separating the zone of optic radiations (*Ro*) from the remainder of the white substance of the occipital lobe. At the posterior part of the radiating crown, the fibers of the inferior longitudinal fasciculus disperse in different directions. The majority terminate in the temporal lobe, and, in particular, in the first and second convolutions of this lobe. Others recurve inward and mingle with fibers of the radiating crown of the optic layer. Another portion contributes to the formation of the external capsule. Others, finally, are in relation with the second and third segments of the lenticular nucleus. It is at the lower part of the external layer that Burdach has given them the name of inferior longitudinal fasciculus.

Between the sagittal substance and the cortex is found a mass of white substance quite as important, and composed of *association fibers* uniting either contiguous convolutions on the same surface, or groups of convolutions on different surfaces of the occipital lobe. These fibers are collected in fasciculi, the chief ones being in more or less direct relation with the calcarine fissure. These are the *stratum calcarinum* (Sachs), situated in the depth of the calcarine fissure; the *stratum proprium cunei* (Sachs), which surrounds the proper grooves of the cuneus; the *transverse fasciculus of the*

cuneus (Sachs), which unites the convolution of the cuneus to the convexity; finally, the *transverse fasciculus of the lingual lobe* (Violet), which brings this lobe into communication with the convexity.

The preceding anatomical facts permit us to make fruitful the documents which have served as a basis for our microscopic researches. These documents are constituted by five cases of hemianopsia.

OBSERVATION I.—The first case is an exceptional example of pure cortical hemianopsia. As a unique symptom the patient presented a left homonymous hemianopsia. At

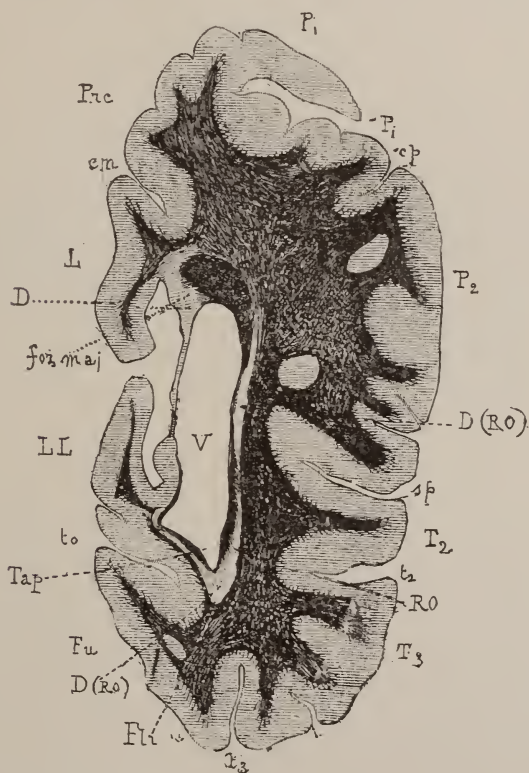


FIG. 5.

the autopsy was found a yellow plaque which, to the naked eye, appeared limited to the anterior quarter of the cuneus (Fig. 5).

Microscopic anatomy, by a series of sections, shows that the cerebral atrophy is in reality much more extended. It comprises very exactly the two anterior thirds of the cuneus, the anterior half of the calcarine fissure, the bottom internal perpendicular fissure, the foot of the cuneus and its prolongation to the foot of the hippocampus, the territory supplied by the anterior branch of the occipital artery—Monokow's parieto-occipital artery.

The secondary degenerations corresponding to this lesion affect two great systems of fibers—the projection fibers or

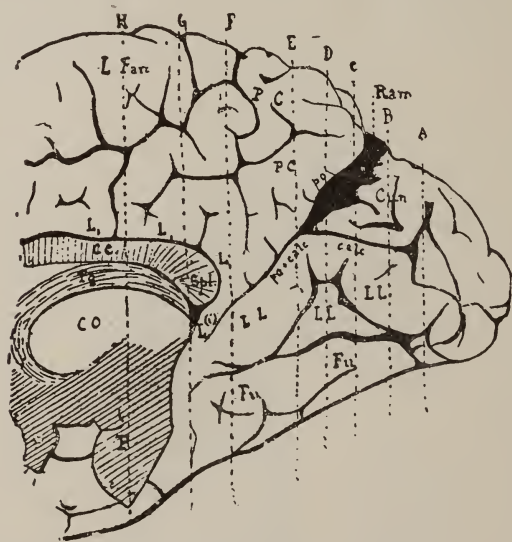


FIG. 6.—Vertico-transverse section passing through the foot of the hippocampus. Double zone of degeneration in the optic radiations: First. Superior zone (*D'Ro*) in relation with the lesion of the upper part of the cuneus. Second. Inferior zone (*DRO*) in relation with the lesions of the calcarine fissure. Commencement of a degenerated zone in the major forceps (*D*).

optic radiations, and the interhemispheric association fibers or the callous fibers. In the layer of radiations it is manifested in two zones; the first, minimum, situated in the middle part of the layer of optic radiations, along the external wall of the occipital cornu. It is in relation with the atrophy of the cortical regions situated at the upper part of the ventricle (Fig. 6); the second, inferior, much

larger, begins at the infero-internal angle of the ventricle, follows the interior wall of the latter, turning its infero-external angle and showing along its external wall, forming as a whole a degenerated semicircle which surrounds all of the inferior half of the circumference of the occipital cornu. This degenerated zone is followed in all the extent of the occipital lobe, then through the parietal lobe, always well circumscribed, up to the central gray nuclei. There the degenerated fibers extend, some to the infero-external part of the pulvinar, others to the infero-external part of the external geniculate body. The internal geniculate body

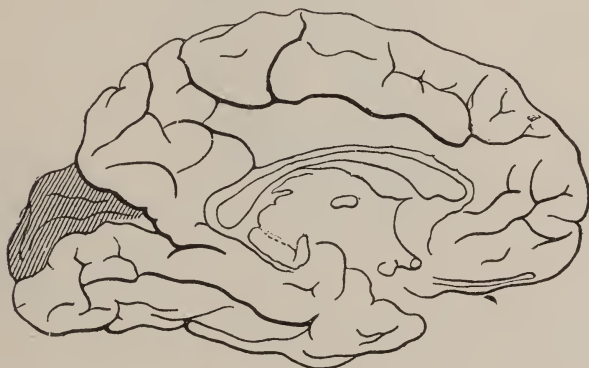


FIG 7.—Internal face of the left hemisphere. The entire cuneus is softened.

and the other parts of the optic layer are free from any kind of alteration. The same is true of the anterior quadrigeminal tubercle as well as of all the internal capsule and of the foot of the peduncle.

OBSERVATION II. The second case offers the clinical picture of pure cortical hemianopsia. As a unique symptom, there exists a right homonymous hemianopsia; as a lesion, an old degeneration of the cuneus (Fig. 7). Microscopical examination shows with great clearness the limits of the softening. Circumscribed to the internal face, it has destroyed the cuneus, and extends on the two lips of

the calcarine fissure, touching slightly on the white substance of the occipital lobe. All parts of the cuneus are not equally altered by the softening. There exists markedly a part of the cortex, at the middle of the cuneus, which has preserved its structure in the midst of

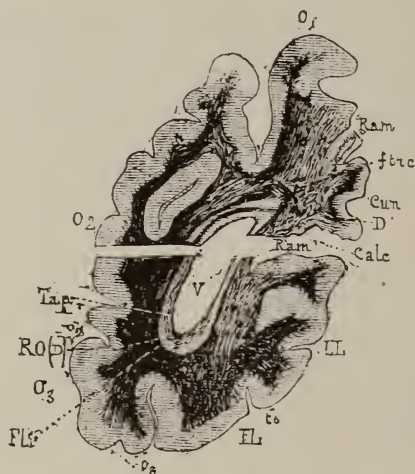


FIG. 8.—Section passing at four centimeters from the occipital point. The softening (*Ram*) is circumscribed to the cuneus, which it has destroyed entirely except an islet of cortical substance. Secondary degeneration of the zone of radiations (*RoD*) and of the tapetum (*Tap*). Preservation of the inferior longitudinal fasciculus and of the transverse fasciculus of the cuneus (*ftrc*).

the entirely disorganized parts. It presents in Fig. 8 under the form of an islet, showing a healthy cortex, and well preserved projection fibers strongly colored.

In relation with this lesion there exists a very clear degeneration of the optic radiations which are pursued into the sagittal substance of the occipital lobe, to terminate at the most external part of the pulvinar and the posterior and external part of the external geniculate body. The internal geniculate body is absolutely healthy.

OBSERVATION III. The third case is the very beautiful one which permitted Dejerme to distinguish a new form of verbal blindness, *pure verbal blindness*, and to establish its

anatomical location. The patient, whose vision was abolished in all the right half of the visual field, was incapable of reading any character. On the contrary, he could write spontaneously and under dictation, copied writing alone being defective.

In relation to these symptoms, the autopsy revealed a very old plaque of the base of the cuneus, of the posterior part of the lingual lobe, and of the fusiform lobe, as well as of the internal temporo-occipital groove of the left

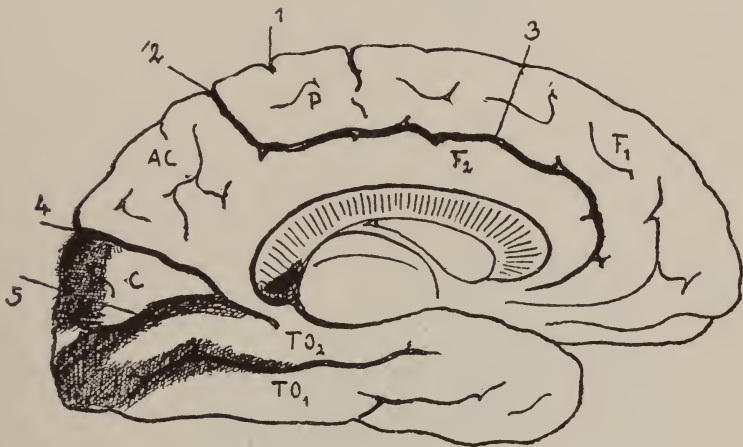


FIG. 9.—Left Hemisphere. Internal face. Old yellow plaque of the base of the cuneus, of the posterior part of the lingual lobe (TO_2), and of the fusiform (TO_1) as well as of the internal temporo-occipital groove. Degeneration of the projection of the corpus callosum.

hemisphere (Fig. 9). Microscopical examination in this case showed that the softening is not alone confined to the cortex, but that it has fused deeply into the subjacent white substance, in all the extent of the calcarine fissure. It has penetrated to the ventricular ependymus (Fig. 10) by causing absolute destruction of the tapetum, of the optic radiations, and of the inferior longitudinal fasciculus at the level of the inferior wall of the occipital cornu.

Here again, we observe a secondary degeneration in the zone of the radiations, a degeneration which is marked

with a great clearness at the field of Wernicke, and in all that part of the latter which covers in a normal state the

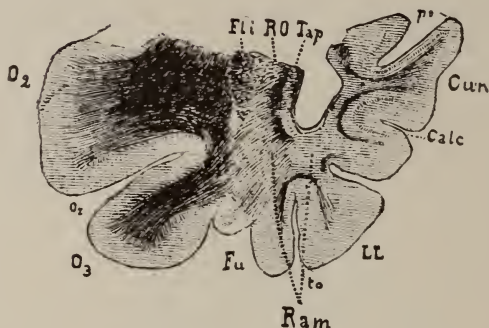


FIG. 10.—Vertico-transverse section in the inferior half of Flechsig section. Complete destruction of the inferior longitudinal fasciculus (*Fli*) on the inferior wall of the ventricle, anatomical lesion of pure word blindness.

posterior and external part of the external geniculate body (Fig. 11).

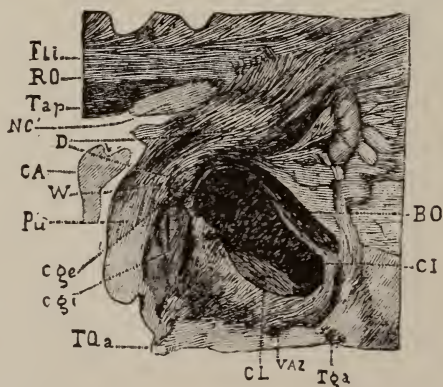


FIG. 11.—Horizontal section at the central gray nuclei, designed to show the secondary degeneration in the ganglionic centers of vision. The degeneration is designated by *D*. It exists in the zone of radiations (*RO*), in Wernicke's field, in the external geniculate body (*cge*) at the level of the posterior part. The anterior quadrigeminal (*TQa*) is only slightly touched.

OBSERVATIONS IV. AND V.—These two cases offer two

examples of ordinary verbal blindness from lesion of the angular gyrus, accompanied by hemianopsia.

In the first there is a *sensorial aphasia*, the patient being affected at the same time by verbal blindness and by verbal deafness. A considerable lesion occupied the posterior part of the first and second temporal convolutions, the angular gyrus, and the major portion of the external face of the occipital lobe, involving in a common destruction the centers of auditory memory and the visual memory of words (Fig. 12).

Microscopical analysis of this case shows that the softening, far from circumscribing its action to the "cortex," and

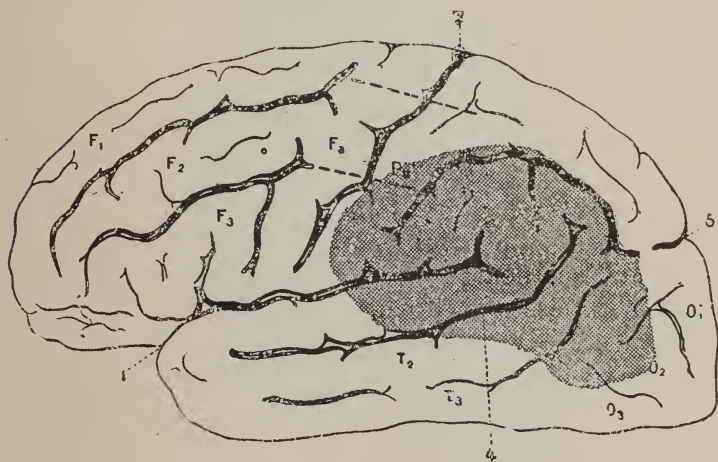


FIG. 12.

consequently to the centers that we mention, penetrates deeply into the white substance, destroys the numerous fibers of association forming the white substance of the occipital and parietal lobes, there advancing to the occipital cornu, of which it attacks the external wall (Fig. 13).

The study of the secondary degeneration shows that, contrary to the preceding case, it is the anterior part of the field of Wernicke which has degenerated, as well as the posterior part of the internal capsule, facts which are in

relation with the seat of the softening on the external face of the hemisphere (Fig. 14).

The last observation presents a much less extended softening. Confined to the angular gyrus, and not exceeding the size of a five franc piece, it presents at first sight as a pure cortical lesion, and one would be tempted to charge

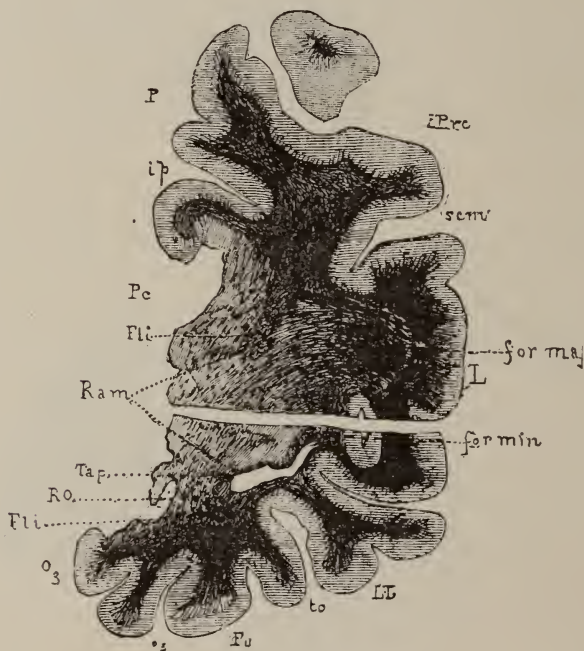


FIG. 13.—Vertico-transverse section passing by the angular gyrus at the union of the two forceps. The softening (*Ram*) extends from the interparietal groove to the third occipital and also penetrates to the ventricle.

the visual disturbance to the destruction of the angular gyrus. The minute microscopical examination of the lesion shows that this conception would be opposed to the actual facts. Here again, as in the preceding case, the necrosis of the elements is not confined to the cortex; it penetrates into the fasciculi of the white sagittal substance, and disorganizes in different degrees the optic radiations, as well

as the callous fibers and the long occipito-temporal fibers of association. These two observations constitute consequently two of the most clear examples of the mechanism by which hemianopsia is produced in the sensorial aphasias, and in particular in verbal blindness. They permit us to concur with Seguin and Dejerme in saying that the hemianopsia which complicates verbal blindness is produced

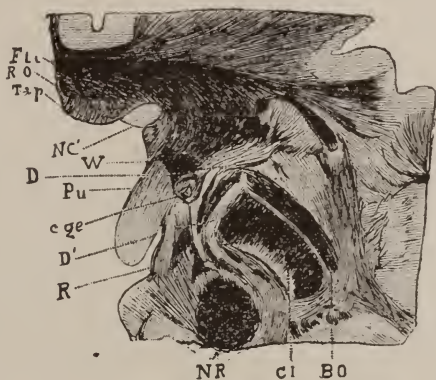


FIG. 14.—Horizontal section passing by the middle part of the external geniculate body. The secondary degeneration (*D*) is localized to the posterior part of this ganglion and of the Wernicke's (*W*). There also exists a second zone of degeneration (*D'*) at the posterior part of the internal capsule.

only in consequence of a destruction in the depth of the intra-cerebral visual fibers.

All these cases show us that the cortical lesions, the most circumscribed, are capable of producing hemianopsia or cortical blindness, according as they are unilaterally or bilaterally situated at the internal face of the occipital lobe radiating into the domain of the calcarine fissure. None of the observations of lesions situated on the external face of the occipital lobe are capable, in our opinion, of pleading in favor of the rôle which would be played by the convexity in the direct perception of visual images, as advanced by Reinhardt.

Is it possible to go farther into the localization of the

visual center by the aid of the facts that we possess? Can we assign to the cortical sphere absolutely fixed limits?

The author who goes farthest in this direction is Henschen. By this author the visual center is localized to the calcarine fissure and the lingual and fusiform lobules. We think that this is going too far, and that if in the sensorial domain the tracts appear to be more fixed than in that of general sensibility, they cannot, however, be compared in this regard to those of the motor zone. Our observations show three lesions of which the comparison is instructive in this point of view; the first, circumscribed to the anterior part of the cuneus, only involves the anterior part of the calcarine fissure; the second occupies the cuneus and all the extent of the calcarine; the third, confined to the lingual and fusiform lobules and to the occipital point, only affecting the posterior part of the calcarine. Now, these three lesions are accompanied by the same visual disturbance, a total hemianopsia.

To conclude that this visual symptom should be referred only to the calcarian lesion, complete in one case, partial in the other two, would be giving anatomical facts a significance that they do not possess. In our opinion, the data show that lesions of the cuneus, of the lingual and fusiform lobes, and of the occipital point are capable of producing the hemianopsia, each on its own account, and that the visual sphere cannot be as narrowly circumscribed as Henschen would have it.

To us, *the cortical center of vision occupies all the extent of the internal face; it is limited in front by the internal perpendicular fissure, above by the upper border of the hemisphere, below by the inferior boundary of the third occipital, posteriorly by the occipital pole.*

The limit which appears best established is the anterior boundary. On the side of the convexity, on the contrary, either at the level of the occipital point or at the level of the infero-external border of the lobe, we cannot trace, with the documents that we possess at present, a definite line of demarcation.

In the region thus circumscribed, the *calcarine fissure* has a special importance; by its extent and its depth, it offers a considerable cortical development. This fissure certainly represents the center of the visual sphere in man and its early appearance in intra-uterine life is further proof of its importance.

Can we distinguish a series of secondary distinct centers, for space, for light, and for colors, as given by Wilbrand? Anatomical facts do not seem to authorize such an hypothesis. Our third observation constitutes in this point of view a valuable document. In this case a lesion of the lingual and fusiform lobes showed in the beginning a typical hemiachromatopsia which was transformed with time into a complete hemianopsia. It appears to us rational to admit that the hemiachromatopsia has been only the initial stage of the hemianopsia, and the cause of the differences observed in the visual troubles appears to reside not in the successive participation of distinct centers, but in the different intensity of the pathological processes in the beginning and in the full period of the lesion.

The group of experimental, clinical, and anatomical facts that we have passed in review, permit us to touch on the localization of the different varieties of hemianopsia and to interpret their significance in cerebral pathology.

If we follow the course of the optic fibers from the retina to their cortical expansion, we see at once that up to the chiasma there can be no question of hemianopsia properly so-called. In fact, monocular hemianopsias do not deserve the name; they are neurites accompanied by more or less symmetrical scotomata of the visual field, varying according as such or such optic fasciculus is affected. In these cases one always observes at the end of a certain period, the ophthalmoscopic symptoms of a papillitis or papillo-retinitis with the usual *cortège* of symptoms.

It is only after the semi-decussation of the visual fibers, that is to say beyond the chiasma, that there can be a ques-

tion of hemianopsia. It remains for us to pass successively in review the different aspects which may be present.

With heteronymous or with peripheral hemianopsia, *from lesion of the chiasma*, we have the distinguishing ophthalmoscopic signs of optic neuritis and of papillary atrophy; co-existence of peripheral paralyses of ocular muscles of the trigeminal, facial, and olfactory nerves, and complications of polyuria or of diabetes mellitus; characters clearly distinct from those of homonymous or central hemianopsia.

The latter is always the symptom of a lesion limited to a place more central than the optic chiasma, a lesion which may be seated in the optic bandelette, in the ganglionic centers, in the optic radiations, or finally in the occipital cortex.

The *optic bandelette* may be affected by basal meningitis—by softening—by tumors which completely destroy in a general way the fasciculi of the optic fibers. The hemianopsia is absolute. Study of the pupillary reflex gives the hemiopic pupillary reaction or Wernicke's sign. In this form of hemianopsia there are frequently associated paralyses of the common oculo-motor, of the external oculo-motor, of the pathetic, even of the trigeminal or of the facial. The paralysis of these nerves is always opposite to the hemianopsia, contrary to what takes place in hemianopsias of intra-cerebral cause. Thus we have here another excellent diagnostic sign.

We may also find hemiplegia and hemianæsthesia from associated lesion of the peduncle, but this complication is rare. The bandelette possesses a separate vascular system. Its vessels are furnished by an envelope of conjunctive tissue proper to it; thus it is the rule that the hemiplegia indicates an intra-cerebral lesion.

A sign that is rarely in default is an intense frontal cephalalgia, either spontaneous or determined by percussion of the cranium.

Hemianopsia from lesion of the ganglionic centers of vision, pulvinar, external geniculate body, anterior quadrigeminal tubercle, approaches closely the preceding class by

the associated paralyses of the different cranial nerves. It differs by pupillary disturbances, mydriasis, and pupillary inequality. Its symptomatology also varies much with the extent of the lesion, which is rarely circumscribed, and manifests a tendency to encroach on the internal capsule.

Hemianopsia of intra-cerebral origin is produced by hemorrhages, by softening, by abscesses, by tumors. It presents particular characters which permit us generally to make the distinction from basal hemianopsias. First of all, the visual disturbance is rarely as absolute as in the latter; the scotoma is usually only relative, and we can observe all the degrees of diminution of vision in the hemianopsic portion of the visual field. Sometimes the luminous perception is that of persistent forms. Colors alone are not recognized. There is hemiachromatopsia. Finally, the hemianopsia may be only temporary, undergo marked amelioration, or disappear entirely.

The pupillary reaction is intact, since the lesion is seated beyond the quadrigeminal tubercles.

Is it possible to distinguish an hemianopsia due to lesion of the optic radiations from one produced by pure cortical lesion? The visual trouble considered in itself does not differ in the two cases. The presence or absence of certain complications are, however, of the highest importance.

If we have pure hemianopsia, accompanied or not by an apoplectic ictus, without disturbances of motility or sensibility, there are strong presumptions that we are in the presence of a cortical lesion of the internal face of the occipital lobe, and more especially of the calcarine region.

But hemianopsia rarely presents with such purity, and cases analagous to those reviewed in the preceding chapter are in the minority. Most often there are added other cerebral symptoms which singularly complicate the clinical picture. Without exceeding the limits of the occipital lobe, the pathological process may produce a more or less complete psychical blindness, by attacking the external face of the lobe. These disturbances are particularly frequent in senile dementia, general paresis, idiocy, with perencephalia.

It is not rare to see the hemianopsia associated with hemiplegia, with or without hemianæsthesia. The latter is usually incomplete or temporary. These motor and sensory troubles are always seated on the same side as the hemianopsia, a characteristic that differentiates them from the paralysis of the cranial nerves in basal hemianopsia.

Disturbances of speech frequently complicate hemianopsia. The presence of ordinary verbal blindness, that is the form accompanied by agraphia, indicates that the angular gyrus is affected and pleads in favor of the seat of the lesion at the external face of the parietal and occipital lobes, with interruption in the depth of the optic radiations. If there exists at the same time disturbance of the auditory memory of words; if, in other terms, verbal deafness is added to verbal blindness to produce the syndrome of sensorial aphasia, we conclude that the processes extend to the first and second temporal.

More rarely than sensorial aphasias, motor aphasia complicates hemianopsia. In this case we have either a very extended lesion of the Sylvian fissure spreading to the occipital lobe, or to multiple lesions attacking at one time Broca's convolution and the visual zone.

We see then that it is especially from the concomitant cerebral symptoms that we derive our diagnosis of the seat of the lesion in homonymous hemianopsia of intra-cerebral origin.

RECENT ADVANCE IN OPHTHALMOLOGY.

BY SAYER HASBROUCK, M. D., PROVIDENCE, R. I.

THE past year or so has not been peculiarly prolific in ophthalmological advance as in all departments of medicine. New fads have arisen with warm advocates and as bitter opponents, but eliminating the wordy discussions and sifting the mass of literary verbiage, little remains that can be called real progress, and of the new theories advanced, time alone will judge of their value and place them in the ranks of ophthalmological truths or relegate them to the forgotten. The record for this year must be then a brief statement of the topics which most interest us, rather than an attempt to elucidate new theories or recount new discoveries.

Among the questions to-day interesting ophthalmologists, that of the functional perversion of the ocular muscles is perhaps exciting the most discussion.

Five or six years ago, the radical statements of Dr. Geo. T. Stevens, concerning the functional disturbances caused by unevenly balanced eye muscles, excited only derision. Since then there has been a revulsion of belief, and I venture to say, that there is not to-day a single ophthalmologist of repute who has not so far forgotten the great folly of tenotomies as to do them repeatedly, and but few who will assert that they have never seen benefit result.

If this be true, it is as certainly true that, within limits, the operation is entirely justifiable and legitimate; as well might we argue, that any operative procedure which has success in only a certain percentage of its trials is useless,

as to claim that failures to cure all existing ills by tenotomies, demonstrates the fallacy of the theory that certain functional disturbances are due to reflex irritation from an unevenly balanced set of ocular muscles.

After six years' trial, ophthalmologists are to-day, I believe, agreed that in some cases it is of undoubted value, in many useless, but on the whole, of enough value to warrant the careful testing of each patient for possible errors, and in the absence of relief from other methods to try the effect of tenotomy or orthoptic exercise.

In a paper read before the State Society two years ago, I reported two cases of epilepsy with muscular errors corrected by tenotomies, only to have a return to the same unbalanced condition in a few days or weeks, and said at that time that when such results were obtained, the advocates of graduated tenotomies claimed them to be due to faulty operative methods. Since that time so many have experienced and reported the same results, that it cannot be ascribed to that alone, and it has, more than anything else, incited to the attempt to correct existing errors by exercise of the faulty muscles rather than, by tenotomy, to weaken the stronger ones. In the discussion of this subject before the Pan-American Medical Congress, Dr. Geo. M. Gould says: "It should be remembered that surgery is not medicine, that it is the despair of medicine and a dernier resort. The true physician only proceeds to surgery when medicine is no longer able to bring relief. I believe that in a few years from the present time, there will be little or no tenotomy in cases of insufficiency of the extra ocular muscles. I protest that the whole muscle question is not a muscle question at all; that the origin of the whole trouble is not in any peripheral organic defect, but that it is almost entirely of a central origin or nature and that it is functional and not organic. A large number of cases of course are to be set aside as due to general disease, and abnormal conditions existing in other parts of the system. If this is the true view, the cure must be a cure, not of the peripheral organs which are not at fault, but of the nerve centers controlling

the extra-ocular muscles. There is disease of the nerve centers, not of the muscles themselves."

It seems to me that this statement of one of the most pronounced opponents of the procedure is an excellent argument in favor of the theory. While decrying tenotomies he recognizes the need of some method of treatment to relieve just that class of cases which are claimed can be so cured, and he seeks this end in the systematic exercise of the muscles.

The condition is entirely analogous to the war between the friends and opponents of the operative treatment of appendicitis. Both recognize the disease, but can see no good in the others' way of treating it.

Six years ago I heard Dr. Francis Valk read a paper before the New York Academy of Medicine, extolling the value of retinoscopy as a means of estimating errors of refraction, and among an audience of fifty, including the most prominent ophthalmologists of New York, but two were found who could say a word in its favor. To-day there is no one who questions its value, and none who do good work in refraction who fail to make daily use of the method in the correction of ametropia, and it is an undoubted advance in ophthalmology.

The current year has, I believe, disproven the somewhat exaggerated claims for the ophthalmometer that it is an absolute or exact instrument, but at the same time recognizing its limitations, has placed its use upon a firm footing as of great value, in both estimating the amount and axis of astigmatism and in judging the nutrient condition of the cornea, while its use in giving the proper glass after cataract extraction is of very great value, and has raised the standard of vision materially.

In a recent case of cataract, trial with lenses gave only 0.2 vision. The ophthalmometer showed an astigmatism of nearly 8 dioptries, axis 170° , and with this glass the vision was at once raised to 0.8+, and after waiting some months for the complete flattening of the cornea, it still showed 6 dioptries, and this glass is worn now with comfort.

Within a comparatively short time, a method of treating diseases of the eye, introduced by Darier, has gained a decided foothold in the ophthalmological armamentarium.

The subconjunctival injection of a sublimate solution for the relief of the deep-seated diseases of the eye has met with favor, and passing beyond, has fallen into some disrepute, solely, I believe, because the range of diseases for which it has been used has been so wide. It is of undoubted benefit in various forms of iritis, in choroiditis, and irido-choroiditis, and performed with due regard to asepsis, beyond the infliction of some pain, it has not, to my knowledge, caused any ill results.

It has been used quite extensively in Dr. Miller's service at the Rhode Island Hospital, with excellent results in a few cases, and remarkable results in one or two. I have used it in private practice in six cases.

In one of interstitial keratitis of four months' standing and resistant to all ordinary method of treatment, three sublimate injections stopped the progress of the disease and improved the vision from ability to count fingers to 0.3.

In one case of keratitis, one injection provoked a cure.

In two cases of iritis, one of rheumatic origin, and one of specific, no particular benefit was seen.

One case of disseminated choroiditis has been benefited to the extent of improving the sight, and in one case of panophthalmitis the disease was, if anything, hastened.

In those diseases which may be considered due to microbic invasion, the consensus of opinion is that it is of great value. The success of this form of treatment has led to the injection of the organic extracts.

In May, 1893, Galteir advocated the use of Sequard's organic solutions in cases of optic atrophy, and the effect of his trial, if not to cure, was at any rate to interest others, for it has been used quite extensively. Recent reports, however, from Bourjon and de Wecker are not favorable to its value as a therapeutic agent.

In refractive work, in the Transactions of the Ophthal-

mological Society of the United Kingdom, Dood analyzes the result of the examination of one hundred epileptics with the following :

Sixty-five were found ametropic and were ordered glasses to correct the error.

Thirteen had not a single attack after wearing the glasses, and this immunity had lasted for months.

Twenty-six were materially improved.

The rest were not benefited.

It must be said that all of the one hundred cases were confirmed epileptics, and the diagnoses were made by the consulting physicians to an epileptic hospital.

A new local anæsthetic has been introduced by Giesel, the pseudo-benzoyl tropeine, with results comparable to cocaine, and of greater advantage in these points :

1. It does not dilate the pupil or affect the accommodation.

2. It does not increase the intra-ocular tension.

3. It does not increase the blood supply.

4. It is not toxic in its action.

A new drug has been introduced which is analagous to atropine.

Scopolamine has been used in most of the diseases for "which atropine is indicated," and has the advantage of rapidly dilating the pupil, without the danger of increasing tension or causing the poisonous effects which are likely to follow the use of the latter.

In recurrent iritis it has proved, in numerous cases, of great value.

The treatment of strabismus is exciting a good deal of interest and discussion, and the promiscuous tenotomies which so many have made have effected a check to indiscriminate muscle cutting. It is a frequent occurrence to find marked divergent strabismus resulting from operative measures, and if for no other reason than to teach us to carefully investigate the refractive condition of each patient before operation, the discussions during the last year have been of great value.

Parinaud divides the therapy of squint into

1. Optical.
2. Functional.
3. Surgical.

And this order is that in which relief should be sought.

It is only after trial by lenses and mydriatics which often correct the deformity, and an intelligent search for faulty muscular innervation, that we should proceed to operation.

In conclusion, words of praise should be given to that large number of American ophthalmologists who are constantly trying to perfect old theories and to advance new ones; ever desirous as they are, of placing the science of ophthalmology nearer the exact sciences.

ABSTRACTS FROM CURRENT LITERATURE.

Randolph.—A Suggestion as to the Treatment of Penetrating Wounds of the Ciliary Region and Lens.

—*N. Y. Med. Journal*, February 23, 1895.

Suggests that in penetrating wounds of the ciliary region the lens acts as a foreign body, its presence increasing the tendency to irido-cyclitis.

He claims that the removal of the lens in these cases, even where the gravest conditions are present, may quiet all irritation and save the eyeball. He cites three cases in support of his theory and formulates the following conclusions :

1. "In penetrating wounds of the ciliary region and lens, even where light perception is gone, and where usually enucleation is performed, the removal of the lens will often be followed by comparatively useful vision.

2. "The time to perform the extraction is in the first week of the injury, when there is less reason for entertaining the fear of sympathetic ophthalmia, and that sympathetic disease is too remote a contingency in any event, and certainly in this stage, to outweigh every other consideration.

3. "The effect of the operation is to remove what is really a foreign body, and at the same time it frees the ciliary region of its infectious contents—very much the effect of opening an abscess.

4. "Cleanliness is imperative in this operation. I usually sterilize my instruments in a two per cent. solution of bicarbonate of sodium; and keep the field of operation constantly irrigated with a two per cent. solution of boric acid. Any solutions that irritate—such, for instance, as sublimate solutions, are to be avoided as they weaken the resisting powers of the eye. The after-treatment consists in the instillation of atropine, one per cent. every four hours, and the wearing of a compress bandage.

5. "Improvement in the cases, as would be expected, is rapid, and unless it is rapid one should not delay enucleation."

DEADY.

Brown, Lennox.—**Indications and Limits of Topical Treatment in Laryngeal Phthisis.**—*Jour. of Laryngol.*, viii., 1894, 185.

In speaking of the local treatment of laryngeal phthisis the author finds a spray of menthol, or menthol and iodol, of greatest service in the pre-ulcerative stage of the disease, whether acute or chronic. It promotes resolution in the hyperæmic form, while it stimulates the capillaries and tends to prevent the interarytenoid deposits and new growths which are more apt to occur in the anæmic form.

Morphia insufflations are not advocated, except in hopeless cases, on account of the bad constitutional effect. Codeia, on the other hand, is found very useful.

Cocaine should only be used as a preliminary to curettement—the rubbing in of lactic acid, or for the temporary relief of dysphagia, in advanced cases. As soon as any sign of improvement occurs the drug should be discontinued.

Insufflation of powders in the larynx is not advised. All remedies being better if used in the form of a spray under high pressure.

An exception is made to this rule in respect to an anodyne composed of compound tincture of benzoin, compound tincture of camphor, and tincture of belladonna, mixed with the yolk of an egg. This the author has used for a long time to relieve dysphagia, by painting the inflamed surface with it just before eating. He also uses it previous to the application of lactic acid, to relieve the pain caused by the thorough rubbing in of the acid, considerable force being necessary if the best results are to be obtained. If no ulceration is present, lactic acid does more harm than good.

Dr. Brown protests against the idea that curetting is an absolute necessity, and speaks of the operation as follows :

"As a rule, curetting, whether of hyperplastic outgrowths or of ulcerations, is necessary before the lactic acid application is ever really effective, but it is by no means indispensable to perform a scraping on every occasion when this agent is used, one in even four or six being, in my judgment, sufficiently frequent.

"Curetting is indicated in my practice for two purposes :

"Firstly. For the removal of hyperplasia ; and I may say that it is very rarely that I employ any other method, even when these excrescences simulate a pedunculated neoplasm.

"Secondly. To clear away necrotic matter, when the ulcers are large, and for uniting the various ulcerative points into one surface, where they are, as is generally the case, multiple."

PEARSALL.

Marple, W. B.—Pathology of Embolism of the Central Artery of the Retina.—*Am. Medico-Surgical Bulletin*, No. 4, 1895.

Marple gives the result of a microscopic examination of an eye which had been enucleated for glaucoma, following an embolism of the arteria centralis retinae, together with an analysis of fourteen cases found in ophthalmic literature. The patient from whom the eye was removed was a woman, aged fifty-six. Sections of the nerve to the number of seventy were made, two or three of the meridional sections showing the embolus. It measured one-seventh mm. in diameter and one-ninth mm. in length. A thrombus was found about one mm. back of the embolus. Just anterior to the point at which the embolus was found the vessel made a sudden turn in order to reach the papilla. The pigment epithelial layer of the retina was unaltered, but the ganglion cells had disappeared. There were evidences of a marked interstitial neuritis and peri-neuritis. In the analysis of the fourteen cases before referred to, he found that, almost without exception, the affection was attributable to cardiac disease. The embolus was very frequently found just back of the lamina cribrosa, its lodgment being due, in all probability, to the narrowing or bending of the vessels at this point. The layer of ganglion cells were first to suffer, while the layer of rods and cones were least affected. The optic nerve became quickly atrophic, which he considers due to a neuritis, as it receives its vascular supply from the affected vessel. The right eye was the seat of the affection in five cases, and the left in nine. The ages of most of the patients were above forty-five.

RITCHIE.

Kalt, E.—On the Corneal Suture and Cataract Extraction.—*Archives of Ophth.*, vol. xxiii., No. 4.

Kalt extols the suture in cases of simple extraction, and gives

his method of introducing it. He uses fine, short, sharp-pointed needles, and thin, strong silk thread, both sterilized. He says: "I pass the needle through the cornea, in the vertical meridian, about one mm. underneath the limbus. The point, without penetrating into the anterior chamber, emerges at the juncture of the opaque border, and the thread is drawn. Then the needle is introduced about one mm. above its point of exit into the episcleral tissue, as is done in the muscular advancement. So soon as I find that the point has penetrated into resistant tissue I draw it out again, in order to involve as little of this tissue as possible. As it is impossible to draw the needle out at right angles, about two mm. of conjunctiva are loaded on it, which is of no consequence. In drawing this thread I leave a loop which is placed sideways toward the nose, and spread out carefully, so as to avoid twisting.

"The corneal section is made in the ordinary way, care being taken that the knife passes nicely through that portion of cornea which the suture has left free. Then I take off the speculum, and remove the cataract as usual. When the iris is well in position an assistant holds the upper lid up, and I tie the thread."

He states that he is not afraid to draw the knot tightly, as the folds thereby produced in the cornea disappear in a day, and have no effect upon curvature. The suture is removed about the tenth day, or before, if quite loose. Care should be taken to avoid cutting the thread when making the incision. In tying the suture, traction should be made on the scleral end of the thread only, the slight opalescence left in the track of the suture quickly disappearing.

He has practiced corneal suture in fifty cases of cataract extraction. In forty-five cases healing was perfect, without accident; in two cases there was some difficulty in the reposition of the iris; in one case prolapse of the vitreous occurred, and on closing the suture, the iris and the vitreous reduced themselves. In only two cases an angular incarceration of the iris occurred, which was excised.

The author believes the corneal suture to be the solution of the question of iritic prolapse in the simple operation. D.

Thompson, J. A.—Mono-Chlorphenol in Tubercular Laryngitis.—*Amer. Medico-Surg. Bulletin*, January 15, 1895.

The writer reports three cases of tubercular laryngitis success-

fully treated with mono-chlorphenol. All were in the stage of infiltration, accompanied by dysphagia, hoarseness, irritating cough, etc., a condition which so often precedes ulceration and necrosis of the parts attacked. The remedy was used in a five per cent. solution, and in ten days or less there was a marked diminution of the swelling, pain, and hoarseness, with subsequent improvement, for a time, in the general condition, due to better nourishment. In one case relief from dysphagia was continued until within twenty-four hours of death.

Besides its influence on tubercular infiltration mono-chlorphenol exerts a local anæsthetic effect, such that, for several hours after its use, swallowing is comparatively easy and the irritating laryngeal cough is much decreased. The author does not mention in particular the effect of the drug when the disease has progressed to the point of ulceration and necrosis.

"Mono-chlorphenol is carbolic acid with one of its atoms of hydrogen replaced by chlorine. It is a colorless, volatile, oily liquid, with a rather offensive odor. It mixes with the light petroleum oils and is freely miscible with glycerin. Like carbolic acid, it is an irritant in strong solution, and may be escharotic. In weaker solution it is anæsthetic and antiseptic." P.

Bull, Dr. Chas. Steadman.—The Subconjunctival Injection of Sublimate Solutions in Chronic Diseases of the Eyeball.—*N. Y. Academy of Medicine, Am. Medico-Surg. Bulletin*, No. 3, 1895.

Bull gives his experience in a series of 48 cases treated by subconjunctival injections of bichloride of mercury. Of these, 6 were parenchymatous keratitis, both vascular and non-vascular; 8 were abscess of the cornea, with hypopion; 2 episcleritis and scleritis (specific); 10 syphilitic (plastic) iritis; 15 irido-choroiditis; 3 traumatic orbital cellulitis; 2 sympathetic ophthalmia; and 2 specific neuro-retinitis. He used the solution in the strength of 1-1000, injecting one-twentieth of a milligram. The results were as follows:

Keratitis—No material improvement, no aggravation.

Scleritis—Rapid improvement.

Iritis—No improvement, no aggravation.

Irido-choroiditis (11 specific)—Improvement in one case only.

Irido-choroiditis (4 non-specific)—Improvement in three cases.

Orbital cellulitis—No improvement, no aggravation.

Sympathetic ophthalmia—Aggravation in both cases, duration prolonged.

Neuro-retinitis (specific)—No improvement, no aggravation.

Summary : Pain is always severe ; reaction severe, as a rule, and sometimes serious. The only class of cases in which the symptoms and course of the disease seemed to be modified were those of scleritis and acute irido-choroiditis. R.

Ransom.—“A Case of Functional Deaf Mutism.”—

British Medical Journal, March 2, 1895.

Ransom relates a case of a miner, aged nineteen, who went to bed in usual health and woke up in the morning unable to hear or utter a sound. The deafness was absolute, so that he gave no sign of hearing a cannon fired behind him. Loss of speech was also absolute, so he was not able to utter any sound whatever. All other faculties remained perfect ; he communicated with his friends by reading and writing. Patient was well developed, of healthy aspect, and showed no signs of a neurotic or hysterical tendency.

Both aërial and bone conduction were lost. There were no symptoms of nervous disease present, vision was normal, the fundi appeared healthy, the pupils were a trifle large, but reacted normally ; the ears were apparently normal and there was no history of their having been diseased. A fortnight later symptoms remained unchanged, except that he now showed anæsthesia of the palate and loss of the palate reflex, and a sudden movement of the hand before the eyes failed to make them blink.

A diagnosis of functional or hysterical deaf-mutism was made, and the faradic current was sent through the larynx by means of an intra-laryngeal electrode, and an electrode placed on the front of the neck. The result was a kick and a yell. He was told that he could speak, and he at once answered : “Yes, I can !” The next minute he could answer questions uttered in a whisper. He went home hearing and speaking normally, after having been deaf and dumb for five weeks.

The diagnostic points of hysterical mutism are :

First. Sudden origin.

Second. Existence of absolute aphasia and aphonia.

Third. Absence of signs of labio-glossal paralysis and usually

of any paralytic phenomena, though hysterical hemiplegia may co-exist.

Fourth. Preservation of the intellectual faculties and the power of writing.

Fifth. Frequent co-existence of hysterical stigmata.

Sixth. Usually rapid recovery, though it may be gradual. In this case there was no antecedent shock or emotion. D.

O. Riegner—Extirpation of a Brain Tumor.—*Deutsch. Med. Woch.*, No. 23, 1894.

Riegner removed a round-cell sarcoma of the size and shape of a goose egg, involving the central convolutions and extending deeply into the brain substance of the left hemisphere, which was accompanied by marked double choked disks. Three days after the operation ophthalmoscopic examination showed a diminution in the swelling and œdema of the right disk and the vessels could be followed to the center. One month afterward the vision was reduced to perception of light in the right eye, while he could count fingers at ten feet with the left. At the end of four months the ophthalmoscope showed complete atrophy of the right disk, the outlines of the left were hazy, and the nerve white, except on the nasal side, which was of a grayish-red color. R.

Priestly Smith.—Hereditary Glaucoma and Its Cause.—*Ophthalmic Review*, vol. xiii., No. 153.

Smith cites a case of primary glaucoma in a woman of twenty-nine, whose father (age fifty-two) also suffered from the same affection. Both exhibited smallness of the eyeballs as an hereditary condition. He states that eyes with a cornea measuring only 10.5 mm. in their horizontal diameter are comparatively rare and show a special predisposition to glaucoma; while eyes that measure only 10 mm. rarely escape the disease. Very small eyes not only are particularly prone to primary glaucoma, but are attacked earlier in life. Concerning the benefit of an iridectomy in such cases he considers that although it may relieve the condition at the time the prognosis is not favorable. R.

Hopkins, F. E.—Recurrence of Lymphoid Hypertrophy of the Naso-Pharynx.—*New York Academy of Medicine, Am. Medico-Surg. Bulletin*, January 15, 1895.

Several cases were reported, in which lymphoid hypertrophy of

the naso-pharynx had returned, after apparently thorough removal. In one child the growth has returned after having been twice removed. It is noted that other cases have been reported, although the text-books either do not mention the possibility of recurrence, or say that these growths do not return if completely removed, and that if even if a small portion is left it forms a sufficient cause for the return of the growth.

The discussion brought out facts in corroboration of the author's experience. P.

Gomperz.—Lipoma of the Nasal Mucous Membrane.—*Monatschr. für Ohr.*, xxviii., p. 280.

The first case on record as occurring in the nasal mucous membrane is described as a tumor about the size of a small cherry, pale red, surface ulcerated and covered with bloody incrustation. The case was one of atrophic rhinitis and the tumor was situated on the upper part of the septum at the junction of the triangular cartilage with the nasal bone. It was removed and, upon microscopical examination, proved to be a lipoma. P.

Owen.—Further Notes on Treatment of Exophthalmic Goiter.—*British Medical Journal*, February 16, 1895.

This is a case of exophthalmic goiter of twenty years duration, cured by thymus feeding. The patient had taken one lobe of the cervical portion of the thymus gland three or four times a week, and is practically well. He has been engaged in most laborious work daily for several weeks, without unfavorable effect; before treatment he was not a day without palpitation, and the slightest exertion fatigued him. He has now been perfectly free from palpitation for six months, and does not feel tired even after a heavy day's work. His pulse is 72; before taking thymus it was constantly over 120. The eye symptoms have disappeared, the thyroid swelling is no longer present, and melancholia is replaced by a feeling of well-being. He has several times discontinued the gland for a time, but finding himself getting worse has resumed it, always with immediate benefit. For the last two months he has taken one lobe a week. D.

Bedford.—Arcus Senilis at Twenty Years of Age.—*British Medical Journal*, January 12, 1895.

The author found, in examining a case of slight trachoma, a

typical and fully developed arcus senilis, occupying the upper margin of the cornea. There were no nebulae or leucomata present; neither were there any signs or symptoms of organic disease to account for the degenerative sign. The patient was under observation for eight months, the arcus senilis being permanent, although the trachoma was cured. D.

White.—Complete Deafness for Twenty-four Years from Eustachian Closure; Perfect Recovery After a Course of Politzeration.—*British Medical Journal*, March 2, 1895.

White cites a case of a woman, aged thirty-five, said to have been quite deaf since she was nine years of age. When first seen she heard nothing at either meatus. Under daily Politzeration, in one week she heard a feebly ticking watch at one-half inch; in three weeks at three inches, and in three months the hearing became normal. D.

Collier.—Headache and Neuralgia Due to Nasal Disease.—*Am. Medico-Surgical Bulletin*, January 1, 1895.

Two cases of headache and neuralgia were reported. The first, a man fifty years of age, suffered from a neuralgia of the lips, tongue, mouth, and infra-orbital region. The pain was intolerable and had lasted for five years. All kinds of treatment had been instituted, including extraction of teeth and division of the fifth nerve, but all were useless. Examination of the nasal cavity showed necrotic turbinated bone and several polypi on the affected side. The removal of these was followed by complete relief.

The second case, a woman sixty years old, had been a subject of constant headache for five years, and at times the exacerbations were very severe. An extensively diseased middle turbinated bone was removed, which resulted in immediate relief. P.

White, Dr. W. Hale.—Intra-cranial Aneurism.—*London Clinical Society, Medical Week*, vol. ii., No. 42, 1894.

Dr. White reported the case of a man having suffered from a cephalalgia of the right frontal region of two years' standing, who suddenly fell and was brought to the hospital in a comatose state. The pupils were dilated and immobile; there was proptosis, convergent strabismus of the right eye, and occasional spasms of

both upper and lower extremities with opisthotonus. The ophthalmoscope revealed a subretinal hemorrhage of about four disk diameters to the temporal side of the optic nerve entrance in the right eye. Death took place seven and a half hours after his admission to the hospital. An autopsy disclosed a clot in the subdural and subarachnoidal spaces over nearly the whole brain surface, and extending along the optic nerve sheaths and under the retina. The blood came from a small aneurism at the termination of the right internal carotid. R.

D'Antona.—Experimental Section of the Fifth Nerve.
—*Il Policlinico*, No. 15, 1894.

In five dogs upon which D'Antona succeeded in making experimental section of the fifth nerve at its exit from the pons, he found that such section was followed by severe trophic lesions of the eye, the resulting power of the cornea especially being diminished so that slight injuries were followed by serious structural changes. R.

Chiari.—On the Structure and Histological Arrangement of the So-called Fibroma of the Vocal Cords.

The paper is an exhaustive study of the subject, and the author, while not denying the existence of fibromata in the larynx, believes them to be extremely rare. That, in the great majority of cases, growths upon the vocal cords are composed of the same histological structure as the cords themselves, and show no evidence of a connective tissue nodule distinct from the inverting membrane of the cord. The tumor is, therefore, a circumscribed thickening of the membrane covering the cord and not a fibroma. This view is upheld by the general appearance of these growths, their location, and by the clinical history. P.

Wray.—Removal of the Lens in High Myopia.—*London Lancet*, February 9, 1895.

Wray thought the operation was not applicable to children with less than 10 D., or in adults with less than 12 D. myopia. The objects were (*a*) to prevent detached retina; (*b*) to arrest or prevent retino-choroidal changes, and (*c*) to enable patients with the highest grades of myopia to work at reading distance if unable otherwise to do so.

He had seen retinal detachment, after the removal of the lens, in a case of myopia, of 30 D., and considered detach-

ment comparatively frequent after operation ; but he claimed that this was less to be feared than the changes in the retina and choroid, and that it was not necessary to regard every myope of 12 D. and upward as hopelessly drifting toward detached retina and blindness.

The point upon which there was unanimity was that the patients were much better able to work after the operation, and some were enabled to follow vocations which had previously been impossible. D.

Jessup.—Two Cases of Diphtheritic Conjunctivitis Treated by Klein's Antitoxine.—*British Medical Journal*, January 12, 1895.

The first case was a boy aged nineteen months, who had membrane on the upper and lower palpebral conjunctiva of the left eye, and a patch of the membrane on the left side of the uvula. One lymphatic gland over the parotid was enlarged, and there was albumen in the urine. Three injections of Klein's antitoxine were given, $1\frac{1}{2}$ drams in all. The membrane disappeared in five days, and was not followed by conjunctivitis or other conjunctival change. There was no local treatment except distilled water.

The second was that of a male child eight months old. There was membrane on the palpebral conjunctiva of both eyes ; the parotid and lymphatic glands were enlarged, and there was a muco-purulent discharge from the nose. Two injections of Klein's antitoxine, 1 dram in all, were given, with no local treatment.

The membrane disappeared in four days. The membrane in both cases was examined, and found to contain large quantities of Löffler's bacillus. The membrane was well marked in both cases, and only affected the palpebral conjunctiva. D.

Eales.—Dilatation of the Iris.—*London Lancet*, January 12, 1895.

Eales gave the history of a patient, aged twenty-one, who was thrown from a bicycle, falling upon the left side of the face, causing superficial scratches and a rather severe shaking. Examination thirty-two hours after the accident showed great but not full dilatation of the pupil of the right eye ; there was no reaction to light, and only slightly to accommodation ; vision was normal for distance ; there was no pain, no evidence of paralysis of the branches of the third nerve, and no dislocation of the lens

or rupture of the choroid. Recovery of accommodation was complete in four days and reaction to light in five days. The patient noticed nothing wrong with the sight until thirty-two hours after the accident. D.

De Schweinitz.—Bilateral Exophthalmus.—Hemorrhagic Neuro-retinitis.—Probable Intracranial Arterovenous Aneurism.—*International Medical Magazine, February, 1895.*

De Schweinitz reports a case of a man, aged forty-one, in previous good health, severely injured by an accident in a mine, causing unconsciousness, but no demonstrable fracture of the skull, the weight of the blow which produced the injury having spent itself chiefly upon the right side.

Three weeks later there was exophthalmus, hyperæmia of the veins of the eyeball, paralysis of the right external rectus, and some passive congestion of the retinal circulation. Three months later the same symptoms without change. Seven months later there were in addition a roaring in the head, which in two months became so intense that it resembled the puffing of an engine, an optic neuritis and retinal hemorrhages. The roaring was found on examination to be a well-marked systolic murmur, particularly noticeable upon the right side; worse in the recumbent posture and when exertion was made. Pressure upon the right carotid stopped the bruit entirely; compression of the left diminished it only. Ligature of the common carotid of the right side was advised. D.

Leplat.—Death From Meningitis After Probing, Following an Injection of the Lachrymal Canal.—*Annales d'Oculistique, November, 1894.*

The patient, a woman, had been treated several months for a dacryocystitis with little success. After introducing a No. 2 Bowman probe, the author first injected water and afterward a solution of acetate of aluminium, neither of which passed into the nose. The next day pressure on the sac forced out pus thicker and more yellow than before, and the sound was introduced, after which acetate of aluminium was again injected. The patient made a quick movement and the canula was torn from the lachrymal canal when the syringe was about half emptied. On this occasion the taste of the astringent was perceived in the

throat, and the patient complained much of pain in the face, and particularly in the gum of the left upper jaw.

Six days later on again seeing the patient, there was a brown stain upon the cheek below and to the outer side of the sac. The patient was in bed, very feeble, and complained of violent pains in the head, particularly on the left side. The left side of the face was much tumefied, swallowing being limited by the median line. The eye was closed, the lids agglutinated with pus and much swollen; she could not open her mouth on account of swelling, and speech was difficult. There was nausea, pulse 120, small and feeble, temperature somewhat elevated.

The case was regarded as erysipelas or phlegmon of the face, and so treated. Later vomiting occurred, pulse became irregular and very frequent; temperature was 39.1 per cent.; there was Cheyne-Stokes respiration, and the patient was unconscious. She rallied somewhat under treatment, but in a day or two there were slight chills, vomiting, pains in the head, twitching of the limbs and somnolence. Patient became comatose and died. No autopsy.

D.

Herbert.—**Modification of the Maddox Rod.**—*Ophthalmic Record*, February, 1895.

Herbert suggests that the rod be made of red glass and cut in half longitudinally, making a strong cylinder. He also advises placing a stenopaic slit of not over 2 mm. behind the rod, thus increasing the delicacy of the test and obliging the patient to hold the head in a proper position in order to see through the slit. The disk has a milled edge to facilitate rotation of the trial frame, and on its anterior surface are two broad white lines at right angles to each other, indicating the horizontal and vertical positions of the streak.

D.

Bordier.—**Electrical Treatment of Exophthalmic Goiter.**—*British Med. Journ.*, No. 1767, 1894.

Bordier has derived much benefit in two cases of exophthalmic goiter by the use of faradism. The method followed was that of Vigoroux, which is appended.

The negative electrode being applied to the nape of the neck, the positive is applied:

1. To the facial nerve (upper branch) and to the orbicularis palpebrarum for half a minute on each side.

2. To the neck, between the hyoid bone and the anterior border of the sterno-mastoid, the electrode being pressed deeply over the carotid artery for the space of a minute and a half on each side.

3. Over the thyroid gland for five minutes.

4. Over the precordium for three minutes.

5. Contraction of the thyroid muscles for a few times.

Repeat the treatment three times a week.

R.

Sanford.—Death from Convulsions After Removal of Adenoids.—*Med. Week., ii., No. 29, 1894.*

The patient was a boy of eleven years, from whom adenoids had previously been removed. He was cocainized, and the adenoid growth scraped out. Five hours after the operation he had an attack of convulsions, preceded by rapid pulse and general nervous excitement. This attack was followed in a few minutes by another in which the patient died, seemingly, from asphyxia. It was thought that the first convulsion was of nasal reflex origin, during which a hemorrhage at the base occurred, which caused the second attack and death.

P.

O'Hara.—Hydatid of Brain.—*Intercolon. Quart. Journal of Med. and Surgery, No. 1, 1894.*

A case of double optic neuritis (more marked in the left eye) occurring in a lad of six years, due to hydatid cyst of the left hemisphere in the region of the fissure of Rolando, is reported by O'Hara. The neuritis was checked on the extirpation of the cyst, followed by irrigation and drainage. The patient made an uninterrupted recovery.

R.

Fischer, Edward D.—Tumor of the Optic Thalamus : Autopsy.—*Am. Medico-Surgical Bulletin, No. 4, 1895.*

Fischer relates a case of glioma of the right optic thalamus with pressure upon the optic tract of the same side, occurring in a woman of twenty-five years, which early in the affection was unassociated with any ocular symptoms with the exception of dilatation of the left pupil, which, however, reacted normally to the stimulus of light. Three months after the initial symptoms the vision began to fail, and a month later examination revealed left hemianopsia and choked disk with paralysis of the left external rectus muscle. Death occurred at the end of the fifth month.

R.

Vierordt, O.—Subcortical Brain Tumor.—*Munch. Med. Woch.*, 1894.

A case of subcortical tubercle of the right motor region, accompanied by exophthalmos and choked disk is reported by Vierordt. R.

Sendziak.—Thiosinamin in Pulmonary and Laryngeal Tuberculosis.—*Jour. Laryngol.*, 1894, vol. viii., p. 115.

The author, after a somewhat thorough trial, comes to the conclusion that the drug does not give satisfactory results in the disease mentioned, and believes that it will follow in the footsteps of Koch's tuberculin and Kleb's tuberculocidin. P.

Bellows.—Two cases of Epistaxis.—*Hom. Eye, Ear and Throat Journal*, February, 1895.

The writer reports two cases of epistaxis of long standing and frequent recurrence. The effect upon the general health was profound. Both cases were treated locally with applications of a saturated solution of bichromate of potash. The drugs used were *Carbo veg.*, 6x; *Kali bich.*, 3x; *Ferrum phos.*, 3x; and *Hydrast. mur.*, 3x. In both cases the ulceration and localized congestion disappeared in a comparatively short time. P.

Fage.—Immediate and After Results of the Sclerotic Suture.—*Annales d'Oculistique*, October, 1894.

The author sums up the immediate advantages of the sclerotic suture as follows:

1. It protects the interior of the eye from infection.
2. It opposes the exit of vitreous, being placed with sufficient care not to provoke it.
3. It prevents formation of fistulæ, cicatrices, cystoids, and staphylomata.
4. It leaves a more regular cicatrix, less retracted and therefore less favorable to ultimate detachment of the retina.
5. It abridges the time necessary for a cure.

It should not be used if the lesion be too deep, or if intra-ocular hemorrhage and loss of vitreous be too serious.

It is contra-indicated when there is a foreign body in the eye, or when the conjunctiva, being intact, covers a rupture of the sclera.

He uses a fine disinfected catgut suture, threaded on two needles, each of which is entered from within outward. The

conjunctiva is united by silk. Wounds in the sclera-corneal region, involving the ciliary body, cause the most intense and prolonged reaction, but this does not persist if the wounds are disinfected and the suture is in good condition. In septic wounds the results are not so favorable. D.

Downie, Walker.—**The Care of the Ear During the Course of the Exanthemata.**—*Brit. Med. Jour.*, No. 1769, 1894.

Downie, in an analysis of 501 cases of middle ear disease in children, found that 131 cases originated during an attack of measles, 63 during scarlet fever, 147 were catarrhal in origin, and 101 occurred during the period of the eruption of the teeth. From the above it is seen that measles and scarlet fever occasioned about 40 per cent. of the cases. R.

Rolland.—**Antipyonin.**—*Am. Medico-Surgical-Bulletin*, No. 4, 1895.

Rolland has given the name "antipyonin" to a polyborate of sodium which he has found of use in inflammatory affections of the conjunctiva and cornea. It is considered to be identical with sodium tetraborate advocated in ear affections (?) by Jaennike. It is a fine white powder of a greasy feel, freely soluble in water, and exhibits no caustic or toxic action. He insufflates a small quantity into the conjunctival cul-de-sac in cases of scrofulous ophthalmia, pannus tenuis, and hyperæmia of the conjunctiva. A larger quantity is necessary in ulcers of the cornea, catarrhal, follicular, and granular conjunctivitis. R.

D'Arguanno.—**Spontaneous Cure of Pharyngeal Tumor.**—*Boston Med. and Surg. Jour.*, February, 1895.

D'Arguanno has collected some cases of sarcomata which, while progressing, have suddenly taken on a retrograde growth and in some cases disappeared entirely. Such tumors are apt to be rich in vessels and change either through alterations in the walls and contents of these vessels or by the action of some particular parasitic growth, especially erysipelas. P.

Argyle Robertson reports a woman of thirty-two years, who has in each eye a filiare beneath the conjunctiva. In the left eye the conjunctiva was incised at 5 mm. from the sclero-corneal border and the worm seized with a pair of iris forceps. Its length was 25 mm. and its breadth 5 mm. It was a male. D.

Cozzolino.—Microcidin as an Antiseptic.—*Bericht über das Jahr, 1894.*

Cozzolino uses a three to four per cent. solution of microcidin (sodium naphtholate) with good results in otitis media suppurative.

R.

Groenouw.—Mydrine, a Mydriatic.—*Bericht über das Jahr, 1894.*

Groenouw prefers mydrine, a white powder, freely soluble in water, representing the combination of the alkaloids, epedrine, and homatropine, to the other mydriatics for diagnostic purposes, as the effect is much more evanescent, it passing off in a few hours. He employs it in a ten per cent. solution.

R.

Burton.—Lemon Juice as a Hemostatic.—*Wiener Med. Presse.*

Dr. Burton reports a case of hematemesis in which pure lemon juice was used after the failure of all ordinary remedies, with the result of arresting the hemorrhage. It recurred on the following day and was permanently stopped by a further administration of the remedy.

An epistaxis in a plethoric young man was checked by the injection of a single syringeful of lemon juice and water, one part to four.

P.

Andogsky.—Ocular Troubles Due to Parasites in the Intestines.—*Annales d'Oculistique, November, 1894.*

This author has seen intense photophobia with blepharospasmus, contraction of accommodation, and considerable diminution of visual acuteness, disappear after the expulsion of the intestinal parasites by the use of santonin.

D.

Guaita.—Rapid Process for the Treatment of Dacryocystitis.—*Annales d'Oculistique, November, 1894.*

The author advises for this purpose, curettement of the lachrymal sac, especially at the superior opening of the nasal canal, followed the next day by a large nasal douche of three per cent. boric acid solution, and on the tenth to sixteenth day by forcible dilatation of the lachrymal canals.

D.

De Schweinitz, E. A.—Aseptic Collyria.

Solutions of cocaine, atropine, and eserine made with trikresol, 1-1000 in water, remained clear and without the growths which

are usually found after an exposure to the air and dust for a period of three months. He finds, on experimentation, that a solution of 1-500 when dropped into the eye causes no irritation ; and that a solution of the same strength injected into the anterior chamber of the eye of a rabbit caused but a slight and transient hyperæmia. It is a good antiseptic, being fatal to the *micrococcus pyogenes aureus*. R.

BOOK REVIEWS.

DISEASES OF THE RESPIRATORY PASSAGES. BY CHARLES PORTER HART, M. D. With 117 illustrations. Second edition, rewritten and enlarged. New York : A. L. Chatterton & Co., 1895.

This work of 350 pages is comprised under seventeen heads, as follows : Anatomy of the Respiratory Passages ; Exploration of the Air Passages ; Affections of the Nasal Fossæ ; Affections of the Oral Cavity ; Affections of the Fauces ; Affections of the Larynx and Trachea ; Affections of the Bronchia ; Influenza ; Hay Fever ; Spasmodic Affections ; Aphonal Affections ; Diphtheritic Affections ; Miscellaneous Affections ; Foreign Bodies in the Air Passages ; Methods of Operating ; Local Treatment. The etiology, pathology, and symptoms of the various diseases are briefly given, followed by the methods of treatment, therapeutic, topical, and instrumental. The chief value of the work lies in the wealth of drug indications, clinical notes, and reports of cases which are scattered throughout its pages. The author has evidently gathered his material for this department from all sources, and this part of the book alone should make it valuable. The pages of the volume are freely illustrated with cuts of the various instruments and appliances used in examination and treatment, and the last chapter contains thirty-two formulæ of solutions for local use.

INTERNATIONALES HOMÖOPATHISCHES JAHRBUCH. Annales Homeopathicæ von Dr. ALEXANDER VILLERS. Vol. II. Dresden Verlag : Expedition des Homöopathischen Archives. Dr. Alexander Villers.

This volume should certainly be represented in the library of every homeopathic physician. In it can be found not only the name of every homeopathic physician in the world, but also the

date of graduation, *address*, *office hours*, and the specialty he may practice.

As we open the book, we first notice that the names of the different countries have been arranged alphabetically, and in the case of the United States, again subdivided into States, counties, and principal cities.

Under each division is given the names of the resident homeopathic practitioners, pharmacists, and chemists.

This is followed by an index, giving merely the names with the number of the page, upon turning to which can be found address, hours, etc., before mentioned. The index of pharmacists and chemists is allowed a separate chapter.

The following chapters are devoted to homeopathic works, journals, and pamphlets, giving the titles and names of author or editor.

Of course there will be found mistakes here and there, but considering the magnitude of the work, this result is to be expected.

In fact, it seems as if this little book should be the agent of bringing within easy touch of each other the widely scattered followers of Hahnemann.

THE JOURNAL OF OPHTHALMOLOGY, OTOLOGY AND LARYNGOLOGY.

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DIOPTOSCOPY.

BY N. L. MACBRIDE, M. D., NEW YORK.

THE principal instrument used in objective dioptry is the ophthalmoscope. The determination of the refractive conditions of the eye by this instrument is termed ophthalmoscopic dioptry or dioptry. There are three methods of dioptry. These are termed direct ophthalmoscopy, skiascopy, and indirect ophthalmoscopy. The ophthalmoscope was invented by Helmholtz in 1851. Its invention placed ophthalmoscopy upon a scientific basis. Formerly it was supposed that all rays of light entering the eye were absorbed by the retinal and choroidal pigment, and that therefore none would be reflected by its fundus. This was proved to be a false idea by several investigators, who had observed that the eyes of certain animals would glow in a darkened room, but not in absolute darkness; thus showing that the light came from some external source, and that the glow was due to reflection from the fundus of the eye.

Other observers had been able to see the retinal vessels of a cat's eye by holding its head under water, and a reflex from the fundus of the human eye had been seen in the case of a person whose iris had been torn off. Helmholtz, having a great knowledge of optics, and being familiar

with the anatomy of the eye, was able to make use of these observations; and he discovered that the reason we cannot ordinarily see the fundus of the eye is on account of its optical construction; it being a property of the human eye, in common with other compound optical instruments, to cause the rays of light that emerge from it to follow the path of incidence. The diameter of the pupil determines the diameter of the cone of rays received on the fundus. It also limits the path of the rays to the central part of the refracting media, and restricts the emergent rays to the same narrow course. In emmetropia the diameter of the reflected bundle of rays depends entirely upon the size of the pupil. The size of the emergent bundle of rays in ametropia depends largely upon the kind and the amount of ametropia, being influenced to a much less extent by the state of the pupil. The fundus of the human eye, being an irregularly reflecting surface, has the property of causing rays of light reflected by it to diverge from its surface as if they were generated within it. Parallel, diverging, and converging incident rays all become diverging rays after reflection by the fundus. Upon refraction by the refractive media, they emerge from the eye as parallel, diverging, or converging rays, depending upon the dioptric power of the eye. A pencil of diverging rays passing through the pupil, and directed toward the source of illumination, would form a larger surface of light than a pencil of parallel or converging rays. If the observer could place his eye sufficiently near the flame, he might receive some of these diverging rays upon his retina; he would then see a portion of the fundus undergoing examination. If the observer could place his eye at the source of illumination, he would be able to see the fundus of the eye, even if its pupil were small and its refraction emmetropic. This might be accomplished in various ways, either by placing in the flame a tube with a screen attached, to protect the observer's eye, or by changing the direction of the incident rays by means of a mirror. Helmholtz chose the latter way when constructing his first ophthalmoscope. It consisted of three

parallel plane glass plates, set at an angle of 56° , and held so as to reflect the light into the patient's eye.

This construction of the instrument polarized the light by reflection, thus doing away, to a great extent, with the annoying reflection from the center of the cornea. The observer looked obliquely through plates which were fixed in a triangular-shaped box, the plates forming the hypotenuse. The smaller perpendicular surface of this box was perforated and opened into a cup-shaped addition which inclosed the eye of the observer. Although this instrument gave a very feeble illumination, with it Helmholtz and Von Graefe examined a great many eyes, and determined their refraction by the aid of several pairs of concave and convex spectacles, and even measured the dioptric power of dead eyes.

The use of the convex object lens, held between the ophthalmoscope and the eye of the patient, was a later discovery, and gave rise to "indirect ophthalmoscopy." The ophthalmoscope has been modified and improved by numerous inventors; and at the time Loring wrote his work on the ophthalmoscope there were more than a thousand varieties in use. The kind of an ophthalmoscope to be preferred will depend upon the use one intends to make of it. If for direct examination, one with a small concave mirror of short focus (8 mm.), having a central perforation not larger than $2\frac{1}{2}$ mm., should be chosen, because only that part of the mirror which immediately surrounds the aperture is available in the direct examination, and should the sight-hole be larger than the pupil, the fundus could not be satisfactorily illuminated. It should be capable of being tilted about 25° , independent of the disk which contains the correcting lenses. This disk is placed behind the mirror, and arranged to rotate in such a manner that the lenses are brought successively behind the sight-hole of the mirror. The lenses should center—that is, the centers of the lenses should coincide with the center of the sight-hole, and every good ophthalmoscope has an arrangement for this

purpose. The lenses should have a diameter of not less than 6 mm., and there should be enough of them to measure the refraction as near as half a diopter. For indirect examination we would choose a concave mirror of about 20 cm. focus, and 33 mm. in diameter, and with a sight-hole about $3\frac{1}{2}$ mm. in diameter. An instrument of these proportions will give the best results, both in the amount of illumination of the fundus and definition of the image formed on the observer's retina. For this method of examination are required only lenses enough to correct any error of refraction or accommodation existing in the observer's eye, in addition to a convex lens, called "the objective," which is used to form the real image seen in indirect ophthalmoscopy.

A plane mirror is used in skiascopy and in the examination of the vitreous. Some ophthalmoscopes contain all these features, but they are large, heavy, and expensive. Loring's latest model is probably the best one for general use, if only one is to be used. It consists of a concave mirror made of silvered glass, of a focal length of 25 cm., of a height of 33 mm., of a breadth of 19 mm., and pierced by an opening 3 mm. in diameter, called the sight-hole; it is swung on two pivots, and is known as "the tilting mirror." At the back of the mirror is a disk containing 16 lenses and a quadrant containing 4 lenses, both capable of being rotated and of centering their lenses. These lenses can be combined, giving a large series of lenticular strengths, all that are required in testing refraction. The lenses of this instrument are 6 mm. in diameter. It is well made and well balanced. Objective lenses of 2- and 3-inch focus accompany it.

To test the refraction of the eye by the ophthalmoscope, we must consider the kind of light used and the laws governing light; also the anatomical, physiological, or pathological condition of the eyes of both the examiner and the examined. Either artificial or day light may be used; the former to be preferred for general ophthalmoscopy. If daylight is used, diffused light must be

selected, and preferably that which is reflected from a white cloud. Direct sunlight must never be used. The vitreous may be coagulated by concentration of the sun's rays into the eye by the objective lens of an ophthalmoscope. To make the examination by daylight, a darkened room, with a small opening to admit light, is necessary. The back of the patient being directed a little to one side of the light, the examination proceeds as with artificial light. Of the artificial lights a lamp or a gas bracket with an Argand burner is to be preferred, on account of the large and homogeneous and steady flame with which they burn. The lamp-light is the steadier of the two, but it is not so easy to change its position, which must be done during the various stages of the examination. Electric light is objectionable on account of the small luminous surface it presents, and, in the case of the arc light, of its disagreeable flickering. Lights such as the Welsbach, in which a fibrous network is heated to incandescence, are not to be recommended, because the network, being pictured on the fundus, interferes with the clearness of the ophthalmoscopic image. A candle is of service when the examination must be made at the bedside.

The optical laws which have to be considered are those that govern regular refraction from spherical and plane surfaces, and those which govern regular refraction from spherical lenses, with special reference to the law of conjugate foci. The law governing reflection by plane surfaces is simple; namely, the angle of reflection equals the angle of incidence. Parallel, diverging, or converging rays are reflected as parallel, diverging, or converging rays. In other words the nature of the ray is not affected by reflection from plane surfaces. On the other hand, concave spherical reflecting surfaces cause all rays of light reflected by them to tend toward convergence. Parallel rays will converge, after reflection from such surfaces, to a point termed the principal focus. Diverging rays will either be brought to or tend toward a focus beyond the principal focus. The law of regular refraction is also simple as

applied to spherical lenses. It is as follows: Rays of light passing from a rare medium such as air, to a dense medium such as glass, are bent toward the normal. The normal to a plane surface is always perpendicular to it. The normal to a spherical surface is the radius of curvature. Convex spherical lenses cause all rays of light refracted by them to tend to converge. The principal focus of a convex lens is the place where parallel rays are brought to a point. It is situated on the principal axis of the lens. Converging rays are brought to a focus within the principal focus. Diverging rays are either brought to a focus beyond the principal focus or are made parallel or rendered less divergent. Concave lenses cause all rays which they refract to tend toward divergence: the principal focus being the negative focus for parallel rays. Diverging rays are brought to a negative focus within the principal focus. Converging rays will be made less converging or parallel or diverging, depending upon their degree of convergence. Foci that bear a constant relationship are termed conjugate foci. The point from which incident rays of light diverge, and the point to which refracted rays converge, are conjugate foci. If the incident focus is brought toward the lens, the refracted focus will recede and vice versa. The position of the one is dependent upon the other. In indirect ophthalmoscopy the real image is formed by the objective lens. This image and that portion of the fundus of which it is the image are conjugate foci. Or to speak more strictly, a single luminous point and its retinal image are conjugate foci. There are certain great advantages in objective dioptry. The primary one is its ability to show the refractive condition of the eye examined, independent of the statements of the patient or the amount of vision of the eye. Second: In measuring the amount of elevation or depression of a given part of the fundus. Third: In distinguishing spasm of accommodation from myopia. The ability to do these several things varies with the method used and with the skill of the ophthalmologist.

To offset these advantages there are several disadvantages : 1st. The absolute inability to determine the normal tension of accommodation. 2d. The great difficulty of measuring the refraction at the fovea centralis. 3d. The great uncertainty in measuring small errors of refraction. In prescribing glasses for the correction of errors of refraction, objective dioptrics must never be used to the exclusion of the subjective method. Subject to the exceptions here given, objective dioptrics is of great value ; not only in testing refraction, but also in measuring normal and pathological elevations and depressions in the fundus of the eye. Direct ophthalmoscopy and skiascopy are of most value ; next in importance come indirect ophthalmoscopy and ophthalmometry.

We will first take up the study of skiascopy, or the fundus reflex test, because it requires less study and practice than direct ophthalmoscopy. This method is known by the names, keratometry, retinoscopy, koroscopy, umbrascopy, shadow test, etc.; skiascopy or fundus reflex test being the best names. Bowman (1859) was the first to use this method. He used it for the detection of conical cornea. In a communication to Donders (1864) he mentioned having used it in detecting astigmatism. After that it seems to have fallen into disuse. Cuignet (1873) revived it, but he was not able to explain the optical principles governing it; so it remained for a long time without general recognition of its value. Landolt (1878) gave the first optical description of it. Parent (1880) enhanced its value by making use of correcting lenses, thus rendering it of practical value. In skiascopy there are two methods: in one a plane mirror is used, and in the other a concave mirror. The plane-mirror method being the more exact and simpler of the two methods—though not the one in general use—we will describe it first. The room in which the examination is made should be dark, in the sense that no light is to be admitted except that used for the examination, and this may be lamp, gas, or electric light ; the first two mentioned being preferred on account of their larger

surface of flame. The best position for the observer will be five meters from the patient, as he (the patient) will not be so apt to accommodate unduly at this distance. The light is best placed a few inches from the mirror and shaded from the patient's eyes, so that his eyes will receive only rays from the mirror, which should be held before the observer's eye; this mirror being a plane ophthalmoscopic mirror having a sight-hole of about 3 mm. The mirror should be turned so as to receive the light and reflect its rays into the patient's eye, causing the eye to glow. By rotating the mirror on its vertical and horizontal axis this glow or luster, followed by a shadow, will be seen to move across the pupil of the patient's eye. By noting the direction, extent, and rapidity of movement, the sharpness of the shadow's outline, and the distinctness of the ocular luster, we determine the kind and to a certain extent the amount of refractive error. In emmetropia the luster and the shadow move in the same direction that the mirror is rotated; the movement being rapid and of great extent, the glow bright, and the outlines of the shadow distinct. In hyperopia the shadow also moves with the mirror. The greater the amount of hyperopia the less distinct is the shadow. The extent and rate of movement of the shadow decrease as the hyperopia increases. In myopia the shadow moves in the opposite direction to the movement of the mirror; and as in hyperopia, the greater the error the less will be the movement and distinctness of the shadow's outline. In astigmatism, the amount and direction of movement will vary with the direction of rotation of the mirror. In simple and compound hyperopic astigmatism the movement of the shadow will be in the same direction as that of the mirror, but will differ in amount and extent in different meridians of rotation. If the principal meridians are vertical and horizontal, the shadow will move more rapidly in one of these meridians than in the other, but always in the same direction. If the principal meridians are oblique, the shadow will move obliquely across the path of rotation. In simple myopic

astigmatism, the shadow will move in two directions; with the mirror in the emmetropic meridian, and against it in the myopic meridian. Obliquity of the meridians will give an oblique direction to the shadow's movements. In compound myopic astigmatism, the shadow will move against the mirror in both meridians, but will differ in extent and rapidity. Mixed astigmatism resembles simple myopic astigmatism, but the extent and rate of movement in the two opposite meridians are not so great. The shadow is never so clearly outlined in astigmatism as in the other refractive conditions.

By the mirror alone can we establish the diagnosis of refractive errors, and approximate their amount. To measure the amount of refractive error, a series of convex and concave lenses is required. These must be placed before the patient's eye, one at a time, and the weakest that reverses the shadow will indicate the amount of error. The kind of lenses to be used will depend upon the refractive condition. For hyperopia use plus lenses, for myopia minus lenses. In astigmatism we must correct each meridian separately. To discover the axis of the correcting glass in astigmatism, the axis of rotation of the mirror must coincide with the principal meridians of the cornea. This method of examination necessitates a room five meters long, but it is the simplest and best method, and more nearly approaches the subjective method than any of the others. In spasm of accommodation it must give precedence to direct ophthalmoscopy. The plane mirror method may be used in a room only three meters in length, when the light is placed above the patient's head; this has the disadvantage of poor illumination and an ill-defined shadow. Another objection is that the patient is very apt to accommodate for the distance of the observer. Yet, with these objections it is simpler and more accurate than the concave mirror method.

The shadow test with the concave mirror is to be made as follows: the light is to be placed above the patient's head, while the observer, seated a little more than a

meter from the patient, illuminates the eye rotating the mirror from side to side and up and down. The movements of the shadow will be in the reverse direction from those of the plane-mirror method. In emmetropia and hyperopia, and in myopia of less than one diopter, the movement of the shadow will be against that of the mirror. In myopia of one diopter there will be no movement of the shadow, the eye seeming to light up from all sides, and to grow dark in the same way. Diagnoses of refractive errors are made, by this method, in the same way as by the plane-mirror method; only, one must bear in mind that the movements of the shadow will be the reverse of those of the plane-mirror method, with the above-named exception. In this method, a myopia of one diopter is taken as the standard, and for this reason a plus one diopter must be subtracted from the number of the glass which causes the movements of the shadow to reverse. If a plus two changes the movement, there is a hyperopia of one diopter. If a minus two changes the movement, there is a myopia of three diopters. If a plus one changes the movement, the refraction is emmetropic. The same principle holds good in astigmatism. The reason why the movements in the concave-mirror method are reversed, as compared with those of the plane-mirror method, is this; the plane mirror is itself the luminous object from which the retinal image is formed, the shadow of which we see moving across the pupillary space. With the concave mirror the inverted image of the lamp which is formed at the focus of the mirror becomes the object for the retinal image. The optical principles governing skiascopy are very simple.

The plane mirror is held so as to reflect into the eye of the patient the rays of light it receives from the lamp. If the mirror is five meters from the patient's eye, we call all the rays parallel, and if he is emmetropic they will be brought to a focus on his retina, forming there an inverted image of the lamp. Parallel rays emerge from his eye and are brought to a focus on the observer's retina, forming there an image. If we rotate the mirror to the left, the

retinal image formed on the patient's fundus will move toward the right side of his fundus. This movement toward the patient's right (our left) will cause the image formed on our retina to move to its right side, and following the law of mental projection, it will be projected toward and seem to move to our left. The same would hold good if the patient were hyperopic. When he is myopic, rays of light issuing from his fundus are converging and consequently they come to a focus in front of his eye. In this case we do not see the image formed on his fundus but the aerial image of it, which is formed at his far point. This image is, of course, inverted and will move in a reverse direction to the movement of the retinal image. This aerial image being the observer's object, its mentally projected image will correspond in movement with it.

The concave-mirror method is not quite so simple. In it diverging rays of light are reflected by the mirror and changed into converging rays, which cross and form an image of the lamp beyond the focus of the mirror. When the mirror is rotated to the left, this image also moves to the observer's left (the patient's right). This image is the object for the patient, and its movement toward his right will cause it to form an image on the left side of his retina. Now, if the refraction of his eye is emmetropic, rays will issue from the left side of his fundus and form an image on the left side of the observer's retina, and this will be projected to, and move toward, the observer's right. In myopia we have simply to consider another inverted image; consequently the final movement will be toward the left, that is, in the same direction as the rotation of the mirror.

Skiascopy is of great value in testing the eyes of young children and those who cannot read. It is also of value as a check on other methods in testing the eyes of ignorant and stupid persons. In spasm of accommodation it is necessary to paralyze the accommodation. And while this enables one to measure the total refraction of the eye, the

accompanying dilatation of the pupil is a disadvantage, inasmuch as it brings the peripheral portions of the refracting media into action. These peripheral portions are, generally, of greater refractive power than the more central portions. In some cases there exists a marked difference; especially is this true of astigmatic cases. A dilated pupil is also apt to bring into play a certain amount of spherical aberration and irregular astigmatism. Probably the greatest advantage skiascopy has over direct ophthalmoscopy is that the observer does not have to relax his accommodation.

Ability to measure the refractive condition of the eye by means of direct ophthalmoscopy should be acquired, even if one intends never to use this method in estimating ametropia. It is by the direct method that tumors, exudations, or excavations of the fundus are measured and their rate of growth noted. By no other method can this be done. By the indirect method these conditions can be detected, but that is all. To perfect one's self in the use of direct ophthalmoscopy requires time, thought, and practice; although there are no real difficulties to be overcome, unless one makes them for himself by struggling to relax his accommodation. The first essential in this method is for the observer to know the refraction of his own eye, and, if error exists, to correct it. Hyperopia and myopia can be corrected by the lenses found in the disk of the ophthalmoscope.

For the correction of astigmatism, a special lens mounted in a clip can be swung in front of the lens disk, or of course one may wear spectacles to correct the defect. The extra lens is the best device, as it allows the ophthalmoscope to be brought nearer the observer's eye. The patient selected for practice should be one whose refraction is known and whose refractive media are clear. His pupil should be dilated and his accommodation paralyzed, so that the observer will have no reason to think that the patient is accommodating. The observer should place the ophthalmoscope before his eye and look into the patient's eye, bring-

ing the mirror as close as possible to the patient's eye, and at the same time keeping it illuminated.

The best part of the fundus to select for the purpose of examination is the temporal edge of the optic disk. If the observer's accommodation is at rest (the patient being emmetropic), he should see the edge of the disk clearly and sharply defined; every little irregularity standing out bold and distinct. Merely seeing the details of the fundus is not sufficient, they must be seen with great vividness. If one does not see them in this way he should not make any effort to see more clearly, for if he does he will accommodate and so defeat his object. He must simply allow both eyes to open and look passively at the dark wall with his unoccupied eye. If this does not produce a distinct image he may know that he is accommodating, and he must then place a minus glass in front of the sight-hole, starting with the weakest, and rotating stronger and stronger ones before his eye until he sees distinctly. Having sharply defined the disk's edge, he should view the other parts of the fundus, changing the lens as the elevations of the fundus vary. Having convinced himself that he can clearly distinguish the details of the fundus, he should begin again at the edge of the disk, trying a weaker lens than before, and so continue; using a weaker and weaker lens until he can make this examination without the use of one. He will find that in this way he will soon get control of his accommodation. He should not select hyperopic or astigmatic cases, nor any case with a small pupil, for his first examinations. Having become expert in seeing the fundus by the direct method, he should endeavor to measure the refraction along the visual line. To do this it is necessary to take some other portion of the fundus than the fovea centralis, it being a poor object on account of its having no markings or distinct outline to focus. The surrounding macula is also a poor object, on account of the great thickness of the retina encircling it. At this portion of the fundus the retina is about five-tenths of a millimeter in thickness, while at the

fovea (the center of distinct vision) it is only about two-tenths of a millimeter. The best object to select is a small retinal vessel, one which gives off branches about two millimeters from the macula lutea. The retina at the point being about three-tenths of a millimeter in thickness, and the vessel dipping somewhat below its level, the increased thickness of the choroid at this point make the difference between its level and the level of the fovea very slight. Even if the difference in level equaled one-twentieth of a millimeter, the difference in the amount of refraction would only equal one-sixth of a diopter. To determine if this vessel is focused, the examiner must observe the light streak, noting if it stands out clear and bright, as it will when the vessel is sharply focused. The lens that enables one to see this clearly will practically define the condition of refraction of the eye. If seen best without a lens, his own and the patient's accommodation being at rest, the eye is practically emmetropic.

To determine the exact amount of ametropia in a given case: if a plus glass is used, subtract from its focal length the distance of the lens from the principal point of the eye. In myopia add the focal length of the glass to the distance between the lens and the principal point of the eye. The same rule holds good in astigmatism. Where a vessel divides, one can generally find branches which run at about right angles. The examiner should select this part and focus each branch. The difference of refraction of the branches will give the amount of astigmatism. In astigmatism this method is not so exact as in simple ametropia. It is of great value in detecting spasm of accommodation. Great authorities like Mauthner believe that spasm of the ciliary muscle always relaxes during a direct ophthalmoscopic examination. The enlargement of the image, when the fundus is examined by the direct method, is of great interest, the patient's eye acting as a simple microscope. In case the patient and observer are both emmetropic, any object in the patient's fundus—the optic disk, for instance—will form an image on the observer's retina of the same

size as the object, irrespective of the distance separating their two eyes. The emmetropic observer would view the patient's optic disk under a visual angle of 5.7° . If the observer could distinctly see an object of the diameter of the disk (1.5 mm.) held at 15 mm. from his principal point, it would appear under this visual angle. In other words the patient's eye acts as a microscope of 15 mm. focal length. If the patient is hyperopic, the enlargement would not be so great when viewed through the correcting lens of the ophthalmoscope. In myopia, under like conditions, it would appear larger. A distance of 250 mm. (or ten inches) has been assumed by American and English microscopists as the distance at which an object should be viewed, to compare its retinal image with that of the retinal image formed by a magnifying instrument. If this comparison is used, the image in direct ophthalmoscopy would be magnified $16\frac{2}{3}$ diameters. That is, the optic disk would seem $16\frac{2}{3}$ times as large as it would if it were viewed at ten inches from the observer's eye without the use of the patient's dioptric media to magnify it.

To find the number of times the optic disk in emmetropia is magnified in direct ophthalmoscopy, divide 250 mm. (the distance assumed for comparison) by 15 mm. the distance (in round figures) of the nodal point from the retina.

The art of testing refraction by direct ophthalmoscopy being acquired, elevation and depressions of the fundus can be easily determined. Every elevation of the fundus will shorten the axis of the eye, and every depression will lengthen it. Shortening the axis of an emmetropic eye will cause it to become hyperopic, and vice versa. To determine the amount of lengthening or shortening, a normal part of the fundus should be examined, and preferably a part near the abnormal portion. Having found the refraction of this part of the fundus, the abnormal portion is to be measured, and the difference in the correcting glasses used will measure the amount of deviation of the abnormal from the normal part. To find the amount of shortening or

lengthening of the eye, multiply the posterior focal length (expressed in millimeters) of the emmetropic eye by the anterior focal length (expressed in millimeters), and divide the product by the focal length of the correcting glass, (also expressed in millimeters); the quotient will be the increase of length in myopia, and the decrease of length in hyperopia, if the correcting lens is placed at the anterior principal point.

Taking the values of the "reduced eye" for our data: posterior focal length, 20 mm.; anterior focal length, 15 mm.; we divide the product by the focal length of the correcting glass. For example: 20 multiplied by 15 equals 300; 300 divided by 1000 equals three-tenths. Therefore three-tenths is the difference in length between a hyperopic or a myopic eye of one diopter and an emmetropic eye. Three-tenths millimeters represents the amount of shortening in hyperopia, and the amount of lengthening in myopia. It must be remembered that this only gives the true measure when the correcting lens is placed at the anterior principal point. If the lens is held at 25 mm. from the principal point of the eye, which is about as near as it is possible to place it with the ordinary ophthalmoscope, this number, 25 mm., must be subtracted from the focal length of the correcting glass, if it be a convex lens, and added to its focal length if it be a concave lens. The following example will explain: Take 100 mm. as the focal length of the correcting lens, held 25 mm. from the principal point. In hyperopia it would be worked out as follows:

$$\begin{array}{r}
 100 \\
 25 \\
 \hline
 75 \) \ 300 \\
 \hline
 4 \text{ mm.}
 \end{array}$$

Four millimeters being the amount of shortening of the axis of the eye in a case of hyperopia equaling 10 dioptries, the lens being held 25 mm. from the principal point of

the eye. In myopia the distance is to be added, for example:

$$\begin{array}{r} 100 \\ 25 \\ \hline 125 \end{array}) 300$$

2.4 mm.

Two and four-tenth millimeters represents the lengthening in such an eye. It is allowable to say in a general way, that 3 diopters of refraction equals 1 mm. shortening or lengthening of the eye. On account of the great errors of refraction caused by a slight difference in the length of the optic axis, direct ophthalmoscopy is a very sensitive and accurate way of measuring tumors, exudations, detachments, excavations, depressions, or protrusions of the fundus of the eye.

TABULATED RESULTS IN THE TREATMENT OF SCLEROSIS OF THE MIDDLE EAR BY THE VIBROMETER.

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IT is not an easy task to reduce one's experience in the treatment of any disease to mathematical terms. Yet the desire to know what actual progress we are making in following some particular line of treatment is very great. It is not enough that now and then some patient shows a gain which is unmistakable and perhaps unexpected. Brilliant and gratifying results in individual cases stimulate the physician to renewed effort in similar but more intractable cases; but in a sober estimate the mind is not satisfied with these sporadic successes. The mental demand is for a precise knowledge of what is accomplished by a definite treatment applied to a large number of cases wherein are grouped all the doubtful and unfavorable results, which are quickly forgotten, as well as those which are so favorable that they impress themselves strongly upon the memory and assume, perhaps, in consequence, an undue importance.

It was this desire which prompted me to ascertain, if possible, just what progress I was making with that most intractable, discouraging, and exasperating disease that aurists are ever called upon to treat—sclerosis of the middle ear. When left to itself we know the inevitable retrograde which progresses, at first insidiously and then more noticeably, from month to month and year to year. I began, years ago, by encouraging my patients to think

that this downward progress might, at least, be arrested by treatment, and the hearing maintained thus at a nearly stationary point—although I had been taught that it was scarcely honest to treat some of these long-standing cases at all. In many instances I found better results than I had allowed either my patient or myself to expect. Still it was by no means clear to me that I was gaining any very positive ground with such patients as a class—the most baffling cases being included in the estimate. When, therefore, the use of the vibrometer had apparently increased my small percentage of success, I determined to devise some means of ascertaining more accurately just what percentage this success amounted to—and, above all, what share the vibrometer really bore in the result.

I began with the records of my vibrometer cases—by which I mean those cases in which I steadily and constantly used the vibrometer as a mode of treatment, even though other measures (as inflations, the internal remedy, etc.) were not necessarily discontinued. In other words, these so-called vibrometer cases were not treated by the vibrometer exclusively, but in all of them the vibrometer was used as an adjunct of treatment which had never been employed before. All of these cases were conducted in private practice and all the measurements were made by myself personally, so that the records could be relied upon for accuracy. In my first table (A) all cases of sclerosis of the middle ear which were treated by means of the vibrometer during the six months named, March 1 to September 1, 1893, are included without exception. The chief difficulty was in reducing the different cases to common terms—some of the treatments continuing for weeks only, and some for months. I decided that the only practicable way was to tabulate by months; entering in each instance the measurement at the first treatment and the last treatment in the month designated, irrespective of the number of treatments given during the month. In all cases the measurement recorded is that taken at the beginning of each treatment and not at the end. The

table does not, therefore, show any sequence of individual cases. Thus, if one case was continued through the entire six months, it would receive a separate and distinct entry in each month. So also, in regard to the ears treated, each must receive its own separate entry; even though with some patients both ears were treated, and with others only one. All tests were made with the same watch, the figure showing the number of inches from the ear at which it could be heard; the normal hearing distance for this watch being forty inches.

Constructing Table A upon these lines, and making the mathematical averages and deductions (Table C), it is shown, as the result of over four hundred measurements, that during this period of six months the average hearing distance of all cases at the beginning of the trial period of one month was 7.79 inches, and at the end the average was 8.67 inches.

The question then arose whether the percentage of gain in these vibrometer cases was really greater than that in previous cases treated without the vibrometer, the other conditions of treatment being the same. To determine this, I went back in my records to the corresponding six months of the previous year (1892), and took, without selection, a number of cases equal to those already tabulated, the method being to take the first cases on the list in each month until a sufficient number had been gathered. Making a similar table from this large group of cases (Table B), the deductions as before made (Table D), show the average hearing distance at the beginning of the trial month to be 11.23 inches, and at the end 12.32 inches. Deducing the percentage of gain for each period of six months, and putting the result of the trial thus far into the simplest possible form, the cases treated by the vibrometer, although the least promising cases, show an average gain of 11.3 per cent., while those treated without the vibrometer show an average gain of 9.7 per cent. In other words, although the cases treated by the vibrometer show an average hearing distance at the beginning which is 30.6

1893		WITH VIBROMETER.										A	
MARCH		APRIL		MAY		JUNE		JULY		AUG.			
First treatment.	Last treatment.	First treatment.	Last treatment.	First treatment.	Last treatment.	First treatment.	Last treatment.	First treatment.	Last treatment.	First treatment.	Last treatment.	First treatment.	Last treatment.
0	6	3 1/2	2 1/2	4 1/2	5	7 1/2	6 1/2	0	0	1 1/2	0	0	0
18 1/2	20	17	22	16	7	15	12	1/2	1/2	12 1/2	12	12 1/2	12
0	1/4	0	0	2	2 1/2	0	0	1/2	0	30 1/2	22	30 1/2	22
1	1 1/2	1 1/4	5 1/4	1	1 1/2	2	3/4	14	15 1/2	9	37	29	37
4	6	27	20	2 1/2	3	3/4	1/2	30	26	29	21	29	21
1	1 1/4	28 1/2	36	4 1/2	5 1/2	2 1/2	4	23	27	19 1/2	17	19 1/2	17
3 1/2	5	30	33 1/2	34	31	3	5	13 1/2	13 1/2	0	1/2	0	1/2
5 1/2	6	1/2	1 1/4	16	18 1/2	14	17 1/2	7	0	1/2	1/2	1/2	1/2
4	4 1/2	7 1/2	5	15	16 1/2	18	29	1	0	12	15	12	15
1/4	1	7 1/2	5 1/2	16	14	1 1/2	0	14	18	5 1/2	6	5 1/2	6
27	30	3	4 1/2	3/4	1/2	19 1/2	22 1/2	8	5 1/2	4 1/2	3 1/2	4 1/2	3 1/2
1	5 1/2	1/2	3/4	7	0	17 1/2	28	3 1/2	3 1/2	6	7	6	7
		33	29	5	14	0	0	1/2	0	6 1/2	4	6 1/2	4
		0	5 1/2	4 1/2	4 1/2	0	1/4	1/4	1/4	11	16	11	16
22 1/2	20	6	10 1/2	1	1/2	6 1/2	7	3	9	11	14	11	14
7 1/2	7	12	15 1/2	1	2	5 1/2	4	6 1/2	18	1/4	1/4	1/4	1/4
2 1/2	4	4	4	5 1/2	6 1/2	2 1/2	3 1/2	7	5	5 1/2	5	5 1/2	5
2 1/2	6	4 1/2	6 1/2	1	1/2	3 1/2	6 1/2	1 1/2	8	18	21 1/2	18	21 1/2
3 1/2	6 1/2	1/2	2 1/2	1 1/2	1 1/2	3/4	1/2	1/2	10 1/2	6	4	6	4
3 1/2	3 1/2	21	30	1	3	1 1/2	2 1/2	14 1/2	16 1/2	12	10	12	10
16	13 1/2	6	7	4	3 1/2	2 1/2	6 1/2	15	18	1	2 1/2	1	2 1/2
4 1/2	5	31	36	6	7	3 1/2	3	7	0	9	14	9	14
1	1 1/4	21	12 1/2	20	28	8	4 1/2	5 1/2	5	11	13	11	13
0	7	5	7	18	16	7	5	20	30	0	1	0	1
	7	9	8	7 1/2	8	12 1/2	9	1/2	5 1/2	6	15	6	15
	4 1/2	6	5 1/2	5	4	28	18	10	12	1/2	2	1/2	2
	9 1/2	9 1/2	8 1/2	11	7 1/2	7 1/2	9 1/2	1/4	2	7	1/4	7	1/4
	3 1/2	2	6 1/2	5 1/2	4	13	12 1/2	21	18 1/2	1/4	1/2	1/4	1/2
	10	11	18	16	9	4	4 1/2	10	9	12	12	12	12
	9	8	7 1/2	9	3	9	12	8 1/2	9	4 1/4	7	4 1/4	7
	1 1/2	2	2	2	3	5	5 1/2	4 1/2	5	10 1/2	18	10 1/2	18
	1/2	1/2	1/2	1/2	1/2	26	45	4 1/2	4 1/2	7	6 1/2	7	6 1/2
	15	13	24	26	1 1/2	6 1/2	6	11	4 1/2	3 1/2	5	3 1/2	5
	2	4 1/2	5	3 1/2	4	5	3 1/2	6	5 1/2	4 1/2	14 1/2	4 1/2	14 1/2
								3	2	2		2	
								1 1/2	1 1/2	1 1/2		1 1/2	
								19	21	21		21	
								6	5	5		5	

per cent. less than that of the cases treated without the vibrometer, *there is yet shown at the end of the trial period a gain in the vibrometer cases, which is 16.5 per cent. greater than that shown in the cases treated without the vibrometer.*

WITH VIBROMETER.				WITHOUT VIBROMETER			
C.				D.			
1893	No. of ears treated.	Average H. D. First Treatment.	Average H. D. Last Treatment.	1892	No. of ears treated.	Average H. D. First Treatment.	Average H. D. Last Treatment.
MARCH	22	5.83	6.99	MARCH	31	13.39	12.64
APRIL	36	10.05	9.53	APRIL	36	11.78	13.46
MAY	36	7.81	8.09	MAY	42	9.31	10.66
JUNE	34	7.54	8.81	JUNE	34	8.74	10.01
JULY	39	7.59	9.25	JULY	33	11.65	13.54
AUG.	34	7.90	9.34	AUG.	25	12.51	13.60
TOTAL	201	7.79	8.67	TOTAL	201	11.23	12.32

Another question here arose. The months selected for the trial were those of spring and summer. It might be urged that the season had much to do with the gain as exhibited in both tables, and that neither method of treat-

1892 WITHOUT VIBROMETER B.									
MARCH		APRIL		MAY		JUNE		JULY	
First treatment	Last treatment	First treatment	Last treatment	First treatment	Last treatment	First treatment	Last treatment	First treatment	Last treatment
3	1/4	10	19	5	13	25	13	13	16
12	13 1/2	20	30	13	14	0	0	25	33
15	7 1/2	19	21	21	24 1/2	2	3	35	31
12	25 1/2	7	8	7	9 1/2	10	7	12	15
12	13 1/2	c	c	7	7	0	2	25	33
14	23 1/2	4 1/2	5 1/2	2	2	6 1/2	5	1 1/2	2
25	21	1/4	1	1 1/4	2	10 1/2	17	7 1/2	9
9	6	1	3	3 1/2	5 1/2	20	29	1 1/2	2
3	3	16	5 1/2	12	7 1/2	11	20	8	11
3	4 1/2	12	22	21	24 1/2	29	30	9	17 1/2
18	7 1/2	20	14	4	3 1/2	3	7	4 1/2	5
13 1/2	14	27	18	7	14	13 1/2	10 1/2	2 1/2	1 1/2
8	2	6	2	8	13	1	2	1 1/4	1 1/4
12 1/2	9	8 1/2	12 1/2	1/2	3 1/2	6	5 1/2	2 1/2	1
33	18	17	16	24	27	1 1/2	2	27	33
12	13	2	3	1	2	8 1/2	5 1/2	11	15
20	23 1/2	10	11	7	10	9 1/2	8	7	8
19	20	20	27	3	10	4	3	16	22 1/2
6	6 1/2	16	13	1	8	1 1/2	1	6	9
8	10 1/2	23 1/2	25	1 1/2	1	c	c	17	17
3	3	7	c	c	1/4	4 1/2	6 1/2	1 1/2	1 1/2
34	31	8 1/2	7 1/2	2 1/2	3	2	1 1/2	13	14
27	31	1/4	7	1 1/2	2	1	3/4	6	2
18	18	26	30	1 1/2	2	1	3/4	6	2
c	1/2	4	4 1/2	1/4	1/2	32	29	25	25
8 1/2	9 1/2	7 1/2	10	17	20 1/2	1	7 1/2	5 1/2	6 1/2
6	2 1/2	33	28	12	20	1	3 1/2	31	27
2 1/2	13	31	32	16	16	23	16	20 1/2	20
25	23	1 1/2	21	2	2	1/4	0	3/4	1/2
c	1/2	0	11	9	10	30	28	14	30
23	23	10	11 1/2	23	23	5	6	7	c
		5	7 1/2	1/2	c	17	29	7	c
		13 1/2	25 1/2	19	14	20 1/2	20	7	c
		15 1/2	12	6 1/2	7	1/2	1	10	10 1/2
		27	26	5 1/2	6 1/2	10	15	21	20
		1 1/2	1/2	10	11				
				16	26				
				33	28				
				25	12				
				1 1/2	10				
				4 1/2	5				
				20	22				
				10	14				

ment would make as favorable a showing during the months of autumn and winter. To meet this question, still another table was constructed (Table E), which includes every case of sclerosis of the middle ear which was treated by the vibrometer during the six months from September 1, 1893, to March 1, 1894. Making the deductions from this table, as done previously (Table F), the result is seen to be an average hearing distance at the beginning of the trial month of 6.39 inches, and at the end 7.29 inches; or, in other words, a gain of 14.1 per cent. as contrasted with the gain of 11.3 per cent. in the similar vibrometer cases of the six spring and summer months immediately preceding. As the autumn and winter months cannot by any means be considered as more favorable for gain than the spring and summer months, this added percentage must, I think, be attributed to added experience in the use of the vibrometer.

Of course, absolute scientific accuracy cannot be claimed for this mode of demonstration, but when there are so many cases grouped together and covering so long a period of time, errors in one direction are more than likely to be offset by corresponding errors in the opposite direction; so that the inference is reasonably certain that cases of sclerosis of the middle ear, even inveterate cases of many years' standing, may, as a rule, not only be held from further loss by treatment, but will actually exhibit a small but positive percentage of gain; and, further, that this percentage of gain is larger when the vibrometer is employed as a means of treatment than when it is not employed. These are the two points which it is the object of this paper to determine.

I will state that the number of vibrometer treatments per week throughout these cases would average less than two, while fully two or three per week are requisite to secure the best obtainable results. The duration of the vibrometer treatments would not average more than three or four minutes, with a decided tendency, as the months passed, to shorten rather than to lengthen the treatment,

1893-94.		WITH VIBROMETER.				E.					
SEPT.		OCT.		NOV.		DEC.		JAN.		FEB.	
First Treatment.	Last Treatment.	First Treatment.	Last Treatment.	First Treatment.	Last Treatment.	First Treatment.	Last Treatment.	First Treatment.	Last Treatment.	First Treatment.	Last Treatment.
3.	1/2	4	5 1/2	5 1/2	7 1/2	0	0	6 1/2	6	2 1/2	2 1/2
6 1/2	5 1/2	17 1/2	22	7	7 1/2	1/4	3/4	3 1/2	1	5 1/2	4 1/2
3.	0	15 1/2	21	7	8 1/2	1 1/2	1 1/4	15	15	5	7
1/2	0	1/2	0	15	12	11	7 1/2	3 1/2	1	6	4
1/2	1/2	9 1/2	10	25	33 1/2	7	4 1/2	7 1/2	6	10	8 1/2
16 1/2	15	14	19	26	34	5	5	7 1/2	6	10	10
18 1/2	14 1/2	23	28	2 1/4	2 1/2	3	1 1/2	0	0	10	10
3.	0	13	12 1/2	4 1/2	6	1/4	1	7	8	11	12
4	3 1/2	21	2 1/2	0	10	4 1/2	5	5	5 1/2	6 1/2	7
0	0	3 1/2	4 1/2	6 1/2	10 1/2	4	0	9 1/2	6	5	6 1/2
1/2	0	5	4 1/2	0	0	0	0	7	0	0	0
5	4	13	22	4 1/2	4 1/2	3/4	1	0	0	0	0
3 1/2	4 1/2	6	8	22	22	20 1/2	23 1/2	0	0	1 1/2	5
11 1/2	12	7 1/2	9	19 1/2	16	20 1/2	21 1/2	1	0	2	3
0	1	8 1/2	8	11 1/2	11 1/2	4	4 1/2	2 1/2	3	1	1
9	7 3/4	6 1/2	18	3	6	0	0	7	3	10	13 3/4
19	22 1/2	3	4	4 1/2	5 1/2	10	14	1/4	2	7 1/2	10
14	15 1/2	1/4	0	5	3 1/2	9	15	1	2	0	0
1/2	1/2	1/4	7 1/2	1 1/2	0	5	5	0	0	0	0
0	1/2	1	1 1/4	4 1/2	5	12	0	1	1	0	0
3	3 1/2	1	1 1/4	4	12	0	1	1	2	0	0
1/4	3/4	0	0	16	34	9	7	5	5	6 1/2	6 1/2
5	4 1/2	3 1/2	5	19	27	19	21 1/2	11	11	11	11
11	15	11	15	10 1/2	10	20	29	11	11	11	11
1/4	2 1/2	12	16	16	7 1/2	16	11	11	11	11	11
9 1/2	9	14 1/2	16	14	0	12 1/2	16	11	11	11	11
6 1/2	7	15	18	24	5	15	12 1/2	11	11	11	11
15	16	7	9	5	5 1/2	5	6 1/2	11	11	11	11
2	2 1/2	4	9	5	4 1/2	5 1/4	6	11	11	11	11
1/4	1/4	4	7 1/2	11	1/2	3 1/2	5	11	11	11	11
1/2	1/2	11 1/2	33	10 1/2	13 1/2	12	11	11	11	11	11
0	0	15 1/2	19	5 1/2	11 1/2	10	11	11	11	11	11
3/4	3 1/2	15 1/2	19	7	7	5 1/2	2	11	11	11	11
12	13 1/2	15 1/2	19	0	6 1/2	7	11 1/2	11	11	11	11
10	12	15 1/2	19	5 1/2	16	4 1/2	4 1/2	11	11	11	11

while, at the same time, the thump of the hammer was used more and more in preference to the strings, and the sound of this was muffled more in the later treatments than in the earlier. It has become a matter of observation

WITH VIBROMETER.			
F.	No. of ears treated.	Average H. D. First Treatment.	Average H. D. Last Treatment.
1893-94			
SEPT.	35	5.27	5.89
OCT.	33	6.68	11.63
NOV.	46	6.58	7.87
DEC.	36	8.04	8.72
JAN.	16	4.54	3.72
FEB.	17	5.20	5.94
TOTAL.	183	6.39	7.29

with me that those cases in which the sound of the vibrometer in the ears ceased immediately upon the stopping of the instrument made better progress than those in which the sound seemed to linger for a few seconds as a subjec-

tive noise. It may be that persistence of the sound indicates some beginning or impending participation on the part of the labyrinth, as is so apt to be the case in the later stages of the disease. Certainly, when the labyrinth is known to be implicated, I use the vibrometer only gently and with caution, and oftenest not at all. As to the effect of its employment upon tinnitus aurium accompanying sclerosis, I have found it less favorable, as a rule, than the effect upon the deafness.

In closing I would further state that these results obtained by use of the vibrometer have encouraged me to investigate other methods of applying mechanical massage to the ear in the treatment of this class of cases, and that still better results are being obtained by me, at present, by the use of vibrating organ reeds and by electrical massage, so that the number of cases in which I now use the vibrometer is much less than formerly. It must be added in justice to the vibrometer, however, that the most brilliant effects of this instrument are obtained in other classes of cases than in sclerosis of the middle ear.

MATERIA MEDICA OF THE NOSE AND THROAT.

BY A. WORRALL PALMER, M. D., NEW YORK.

EXPLANATORY NOTE.—Upon reviewing the number of drugs which should be considered in an article of this character and the space at its disposal, it will be impracticable to treat each as fully as in the first paper. Therefore, only the polychrests, or those having action on the major part of the respiratory tract, will be so dealt with, while others will be considered in a more concise manner.

BROMINE.

In the respiratory tract, as elsewhere, principally affects the nerves. In nares is *obstinate, fluent coryza, stopped feeling*, violent sneezing, and corrosive soreness on margin and under the nose; coryza with sensation of cobweb on the face. Scrofulous ulceration of throat with threatened gangrene. **Reflex spasms of the larynx from stomach, teeth, or enlarged thymus. Spasmodic closure of glottis*; *voice first deep and rough, later aphonic; feeling as if the pit of the throat were pressed against the trachea. Spasmodic or false croup principally; difficult breathing > by drinking cold water; rasping, whistling breathing or rattling of mucus; scraping and rawness in larynx and upper trachea, paroxysmal cough. *Acute and subacute laryngitis*, with cold sensation in larynx on inspiration; *scraping and rawness, provoking dry cough*; harsh, hoarse voice, or weak stitches in posterior part of the larynx; an occasional deep respiration necessary from time to time;

cough, with paroxysm of suffocation suddenly on swallowing. Particularly indicated in scrofulous subjects, light hair, blue eyes, fair skin, subject to glandular indurations.

BRYONIA ALBA.

The sphere of action is principally upon the larynx and trachea. Hoarseness; *sensation of vapor in trachea on going from warm room into the open air, causing coughing, with feeling as if could not inspire enough air; **dry cough*; *dry cough as from the stomach (sepia); *dry cough caused by crawling and tickling in pit of the stomach; **must hold chest with hands when coughing*, because it *seems as if flying to pieces*; is almost a specific for cough and *laryngo-tracheal catarrh accompanying*, and as *sequelæ of measles*; cough accompanied with sneezing (*scilla mar.*=paroxysm of cough ends with sneezing). Epistaxis, passive, in young people, occurring *unprovoked in morning after rising* (*carbo v.*; *phos.*); vicarious menstruation, accompanied by gastric symptoms; also hemorrhage from pharynx and naso-pharynx. Coryza dry, characterized by the drawing, stitching pain in frontal region, or fluent coryza with some headache when the cough and catarrhal symptoms of the larynx and trachea are very prominent, indeed almost masking the nasal symptoms, or, in other words, the influenza, instead of passing gradually through its successive stages, attacks the whole mucosa, from nares to trachea almost at once. Indicated in parosmia, also adenomata laryngis. Accompanying these catarrhal symptoms are frequently found the characteristic thirst for large quantities; constipation, etc.; morning aggravations.

CALCARIA CARBONICA.

Nares.—(*Objective*).—Intermittent swelling, especially at root; sore ulcerated nostril preceded by frequent sneezing (nitr. ac). *Polypi. *Excessive redness of mucous membrane of the nose and throat, with great sensitiveness to local applications (not a congestive nor a chronic venous hyperæmia, but rather an evenly diffused heightened color).

*Soreness and ulceration of septum. *Swelling externally and internally. *Atrophic catarrh. *Rhinitis in scrofulous subjects.

(*Subjective*).—Dryness at night. Sneezing. Sneezing with coryza. Stoppage in morning on rising. *Excessive sensitiveness of nostril to local applications, especially stimulants, astringents, and absorbents.

(*Discharge*).—*Coryza, clear and watery. Coryza with headache. Stopped coryza with or without sneezing. Fluent coryza. **Chronic ozena with which purulent fetid discharge, corroding the lip, with ulceration, and swelling at root of nose.* (Merc. sol. = corrosive greenish fetid pus; creos, kali iod. = discharge fetid, acrid, etc.)

(*Epistaxis*).—Bleeding in morning. (Bry., carbo v.) *Inclination to nose bleed in fat children.

(*Olfaction*).—Offensive smell in nose. Smell before the nose as of bad eggs or of gunpowder.

Naso-Pharynx and Pharynx.—(*Objective*).—Swelling of tonsils with elongation of uvula and feeling when swallowing as if throat were too narrow. *Dilated veins on soft palate and pharynx, giving rise to bluish tinge. *Nasopharyngeal catarrh with general constitutional indications for drug.

(*Subjective*).—Spasmodic contraction of pharynx (apis mel., hepar s., nitr. ac.). Stitches when swallowing. Pain as from internal swelling, extending to the ears. Feeling in pharynx in afternoon, as if something stuck in it, with nausea (zinc).

(*Discharge*).—*Thick, jelly-like, tough discharge (hydras. m., kali bi.; merc. prot.; etc).

Larynx and Trachea.—(*Objective*).—*Chronic inflammation in larynx and trachea, with hoarseness. Chronic inflammation of larynx, especially the upper part. *Necrosis of laryngeal cartilages in rachitic emaciated subjects. *Mucous membrane of larynx chronically thickened in scrofulous persons. *Lupus.

(*Subjective*).—Whistling in larynx in evening on lying down. Roughness < in morning. *Painless hoarseness, so

that she was unable to speak, < in morning (phos.).
 *Spasms of larynx. *Very weak voice. *Raw feeling in larynx with thick, jelly-like, or tough discharge from larynx and naso-pharynx.

(*Discharge*).—Expectoration of blood when coughing and hawking, with a rough and sore sensation in chest (phos.).
 *Thick, jelly-like, tough discharge.

(*Cough*).—*C. at night*. *C.* caused by eating, *c.* from playing on piano, *c.* from inspiration, *c.* from sensation of a plug sticking in throat and moved up and down. Tickling *c.* as from feather in throat (bell. = *c.* from tickling in back of larynx. Sulf. = *c.* with rawness in larynx. Phos. = *c.* from tickling in throat, usually with hoarseness and oppression of chest). Dry *c.* after midnight (ars.) so that head and arteries throb. *C.* < night. Hacking *c.* in evening < in bed. (Hyos. = *c.* soon as lies down. Puls. = *c.* worse at night when warm in bed.) Violent *c.* with pain, as if something had been torn loose from larynx, first dry then with profuse salty expectoration. *C. with sweetish mucous expectoration* (stan.). **C. in evening and after lying down at night, with mucous expectoration, but during the day, only little dry c.*

Characteristics and Concomitants.—Scrofulous diathesis; leuco-phlegmatic temperament; light hair, blue eyes, protuberant abdomen; catarrhs, etc., in children and women, in latter when occurring about climacteric, are most amenable to this drug; frequently indicated in cachexia, leading to various forms of consumption.

Anxiety and palpitation of heart; despondent mood; dread of accidents happening; fault finding.

Vertigo on suddenly turning the head; rush of blood to the head; icy coldness in and about the head; head and upper part of body sweats profusely, especially at night; fontanels large.

Conjunctivitis phlyctenulosa.

Crackling in ears when chewing (catarrh of eustachian tube).

Tardy dentition.

** Swelling of submaxillary glands as large as hens' eggs and hard, with painful tension when chewing, and sticking when touched ; * many cases of goiter relieved.*

Appetite large, but emaciated, food does not seem to assimilate.

Occasional catarrh of intestines, indicated by chronic diarrhea of whitish and liquid, yellowish gray, or the opposite, dry, hard, clay-like stool.

Whole chest is sensitive to touch and during inspiration, person subject to frequent attacks of bronchitis or chronic bronchorrhœa ; pigeon-chested ; *dyspnœa on climbing stairs* ; necessary to take deep breath which caused sticking, now in right, now in left side of chest or hypochondrium.

Pain in region of, or between scapulæ, < on riding, sneezing, gaping, coughing, or other jarring ; pain in small of back ; feet cold and damp.

** Child sleeps restlessly.*

CALCAREA FLUORICA.

Hypertrophy of Luschka's tonsils and accompanying hypertrophies of mucous membrane in posterior portion of nares, so often found in infancy and childhood (usually used in conjunction with some oil for its hydrogogue effect on the tissues). Congenital hereditary syphilis manifesting itself by burning pains and heat in parts ; discharge of thin ichorous mucus, even stage of ulceration or necrosis. Said to be of benefit in exostosis or osteomata of traumatic origin.

CALCAREA IODATA.

Pharyngeal mucous membrane, thin, glazed, shiny, and anæmic ; nodular hypertrophy of tonsils ; similar enlargement of all glandular tissues in this region, *e. g.*, Luschka's tonsil, supernumerary tonsil, and lingual tonsil. It frequently benefits laryngeal spasms, atrophic pharyngitis, laryngitis, in scrofulous subjects, when the most notice-

able symptom is the hard enlargement of lymphatics both in cervical region and elsewhere.

CALCAREA PHOSPHORICA.

Nares.—(*Objective*).—* Polypi narium, gray in color, bleeding easily. * Mucous membrane pale and relaxed (calc. c. = the opposite).

(*Subjective*).—* Frontal headache and pressure at bridge of nose (indicating involvement of frontal or ethmoidal sinuses).

(*Discharge*).—* Chronic catarrhal discharge in anæmic subjects.

(*Epistaxis*).—Bleeding in afternoon ; * pure, partly coagulated blood.

Naso-Pharynx and Pharynx.—(*Objective*).—* Adenoid vegetations in vault. * Pale, flabby hypertrophy of tonsils, or chronic inflammation and hypertrophy of pharyngeal follicles, accompanied by other glandular enlargement in strumous persons. * Mucous membrane thickened.

(*Subjective*).—Sore, aching, on swallowing ; burning from surrounding parts toward throat. * Difficult deglutition. * Dryness and burning during empty swallowing, and on swallowing first mouthful, < if have not spoken or swallowed for a short time. (Canth., burning on deglutition extending downward. Act. rac. = empty deglutition, painful.) * Fullness, either merely sensory, or, due to presence of bloody mucus. * On empty deglutition, sensation of having swallowed uvula, and it had adhered to posterior wall, causing choking, only ameliorated by again swallowing.

(*Discharge*).—* Yellowish-white thick mucus.

Larynx and Trachea.—(*Objective*).—It is said to have caused resorption of papillomata, fibromata and fibro-cellular tumors.

(*Subjective*).—Hoarseness. * Suffocative fits in children after nursing, < after crying, and after being removed from the cradle, head thrown backward, face blue, fighting with hands and feet, attacks followed by relaxation ; frequent,

short, difficult breathing (brom.; hepar s. c.; lob.; kaolin; spong.). Sighing.

(*Cough*).—*Suffocative c. of children, > lying down, < sitting (bry. = similar c. < by motion).

Characteristics and Concomitants.—Scrofulous diathesis; flabby, shrunken, emaciated; general malnutrition.

Mental anxiety; fault finding.

Headache of schoolgirls; sensation of ice lying on upper part of occiput.

Difficult hearing; singing and noises in ear.

Bad taste in morning, < when hawking.

Complexion dirty white; comedones.

Swelling of cervical and submaxillary glands.

Burning in epigastrium; weak, empty sensation in stomach; *imperfect digestion often accompanies hypertrophic catarrh.

Difficult passage of even soft stool; *fistula in ano* alternating with chest symptoms.

*Leucorrhœa occasionally accompanies catarrh of the respiratory tract.

Contraction of chest; difficult breathing, > lying down, < on rising up; sharp pain in chest, < on deep inspiration; bronchorrhœa.

Great weariness after slight motion; backache; *sensation of emptiness, weakness, or sinking is peculiar to this drug*; *languor accompanying catarrhs and influenzas.

Sweating in axilla.

AN EXPERIMENTAL NOTE UPON THE ALLEGED ROTATION OF THE IMAGE IN OBLIQUE ASTIGMATISM.*

BY HAROLD WILSON, M. D., DETROIT, MICH.

UPON viewing a straight line through a cylindrical lens, held several inches from the eye, it is well known that its apparent direction changes as the lens is rotated upon the visual axis. With a concave lens the line appears to rotate toward the axis of the cylinder, while with a convex lens—so long as the image of the line is virtual—its apparent rotation is away from the axis. On the basis of this fact, and with the assistance of some “hundreds” of clinical cases, and a few physiological experiments, Dr. G. C. Savage, and those who have followed him in this matter, have sought to establish certain novel theories in the domain of ocular pathology. The views of these gentlemen in this field may be summed up as follows, omitting minor corollaries:

1. In oblique astigmatism—that is, where the planes of greatest and least curvature do not occur at 90° or 180° —there is a rotation of the retinal image, it being “displaced toward the meridian of greatest curvature.”

2. This rotation causes the images in the two eyes to fall upon dissimilar portions of the two retinæ.

3. To overcome this lack of harmony in the situation of the retinal images, there is (1891) a symmetrical contraction of the oblique muscles, rotating the eyes oppositely upon their antero-posterior axes.

* American Institute of Homeopathy, June, 1895.



FIG. 1.



FIG. 2.

4. The normal muscular equilibrium of the eyeballs may be disturbed, not only by insufficiencies of the recti muscles (heterophoria), but also by insufficiencies of the oblique muscles (cyclophoria).

5. This cyclophoria may be demonstrated by the use of the Maddox prism before one eye, with a horizontal line as a test object. This test discovers that in near vision there is a rotation or torsion of the eyeballs in some cases.

6. To correct this "cyclophoria" the gymnastic use of cylindrical lenses is resorted to to rotate the retinal images, and thus to exercise the weak oblique muscles.

The validity of these propositions, which, I think, state the case fairly, has been called in question by several writers during the past year. F. B. Eaton*, F. C. Hotz†, and the writer‡ have together shown :

1. That in oblique astigmatism the retinal image is not rotated.

2. That in convergent vision the eyeballs are normally rotated outward, a physiological fact, long ago discovered and easily verified.

3. That the tests with the Maddox prism and the horizontal line, showing torsion of the eyeballs in convergence, simply demonstrate a physiological process.

4. That in consequence of these facts, the theories of Dr. Savage, relative to "cyclophoria" and the "harmonious symmetrical action of the oblique muscles in oblique astigmatism" are proven not to rest upon a foundation of scientific truth. Further proof of the invalidity of these theories than that given in the papers above cited is not necessary, but the writer has thought that the truth of the matter might be made more clear by a series of photographs showing directly the influence of astigmatism upon the character and position of the image formed by a dioptric system. Instead of using the dioptric system of the eye itself, that of a photographic camera has been employed. The analogy of such a camera to the eye itself

* Trans. Sect. Oph., Am. Med. Asso., 1894. † *Annals of Oph. and Otol.*, vol. iv, p. 101. ‡ *Arch. of Oph.*, vol. xxiii, p. 276.



FIG. 3.



FIG. 4.

is close enough to render the results of the experiments conclusive.

The photographs, which are reproduced with this article, were taken with a Premo 4 x 5 camera, fitted with a Bausch & Lomb rapid rectilinear lens. The stop employed was f. 11, which corresponds to the human pupil in a state of moderate contraction. The view selected was one which would readily show any rotation of the image. The lens was rendered astigmatic by the addition of a -2 D. cylinder, placed in front of the front lens of the camera, and nearly in contact with it. Except in Figs. 5 and 6, the focus of the camera was maintained at that point necessary to obtain the clearest image with the unastigmatic lens—that is, at the focus of fig. 1. The illustrations show the retinal image as it would appear upon viewing the inverted retina from the front. The vertical and horizontal meridians correspond exactly in all the views.

Fig. 1 illustrates the image in the emmetropic eye. Fig. 2 shows the image in an eye with hyperopic astigmatism of 2 D., the meridian of greatest corneal curvature being at 45° . The negative has been accidentally fogged a little upon its left border, but the main details of the image are distinctly shown. Upon comparing this view with that in Fig. 1, it is evident, at once, that the image has not been rotated on the visual line. All objects are distorted and marked by the predominance of the diffusion lines (ellipses) running parallel to the meridian of least curvature. Fig. 3 shows the image formed when the axis is in the opposite extremely oblique position—that is, with the meridian of greatest curvature at 135° . The same engraving would serve to illustrate the image formed at the posterior focal plane in astigmatism where the meridian of greatest curvature was at 45° , except that the image is a little too small. Fig. 4 shows the distortion of the image when the astigmatism is not oblique, but has its meridian of greatest curvature at 90° . It differs from Figs. 2 and 3 only in the nature of the distortion, showing neither more nor less of rotation, properly speaking. Figs. 5 and 6 show the images in as-



FIG. 5.



FIG. 6.

tigmatism such as we have in Figs. 2 and 3,—that is, oblique,—when the power of accommodation has brought the middle of the focal interval upon the retina. These views are interesting as showing how, by the accommodative act, a patient with hyperopic astigmatism may improve his vision, the images being much clearer than in Figs. 2 and 3. Incidentally we may note the fact that this effort of the accommodation is parallel to that which occurs in hyperopia, and is probably the efficient cause for the asthenopia experienced by such astigmatic patients. In these views the nature of the distortion produced by the astigmatism is well shown by the rhombic figures of the linear high-lights in the windows of the church belfry.

In general, the illustrations explain themselves, and need no more detailed descriptions than we have already given them. Each reader may search them for himself; but, so far as the writer can observe, they only serve to corroborate what the other critics of Dr. Savage's theories have already demonstrated.

DEAF-MUTISM.

BY GRANT SELFRIDGE, M. D., SAN FRANCISCO.

DEAF-MUTISM, its causes, prevention, and treatment are so imperfectly understood by the majority of the laity, and by many practitioners of medicine, that I shall endeavor to elucidate the subject in the course of this short paper. It is my object to awaken an interest among the members of the profession in the unfortunate lot of the deaf-mute, and, through the agency of aural specialists, to endeavor to convince the general practitioner that many cases of congenital deafness, so-called, and cases of commencing deafness, are amenable to rational treatment. Experience, which is based on the results obtained by operative treatment, has convinced me that the majority of cases of deafness in the early stage are curable, and that the general practitioner,—the family physician,—through his lack of knowledge of aural and nasal affections, and through his unwillingness to co-operate with the specialist, is directly responsible for a great part of the vast army of deaf and dumb people throughout this broad country of ours.

An erroneous notion entertained by many of the laity—and, strange to say, by some physicians—is that a deaf-mute is an individual devoid of mental vigor, who can never be taught to speak or hear.

Deaf-mutism, as defined by Holger Mygind in his recent work on that subject, is “a pathological anomaly of the auditory organs, either congenital or acquired in early childhood, causing so considerable a diminution of the power of hearing as to prevent the acquisition of speech,

or—should speech have been acquired before the occurrence of the loss of hearing—as to prevent its preservation by the aid of hearing alone. Individuals exhibiting this pathological condition are described as *deaf-mutes*, even when speech has been acquired by a special system of instruction.”

The causes of deafness in relation to the deaf-mute have been variously classified by different writers, and are usually founded on the records of the different public or private institutions for the education of the deaf.

The classification given by Keiper, in a paper read before the Mississippi Valley Medical Association at Indianapolis, in 1893,—one of the best I have seen,—is based on the records of the public asylums in nineteen States (America). He divides the causes as follows:

“1. Congenital.

“2. Adventitious.

(a) Predisposing.

1. Age.

2. Inflammation of the upper air passages.

(b) Exciting.

1. Scarlet fever.

2. Meningitis.

3. Measles.

4. Mumps.

5. Catarrh.

6. Typhoid fever.

7. Scrofula.

8. All other causes not given in the table.

“The latter comprise some thirty odd affections, and range from ‘boils and sore eyes’ to ‘inflammation of the bowels,’ including all diseases of children.”

Through the kindness and courtesy of Mr. Warring Wilkinson, the able principal of the Institute for the Deaf, Dumb, and Blind, at Berkeley, Cal., I have had the opportunity of examining the ears, nasal cavities, and throats, of all the deaf children. This examination was prompted by observation of the results following the

removal of post-nasal growths from a number of children and grown persons, affected with commencing deafness, and was undertaken before I had had the pleasure of reading the admirable papers of James Kerr Love of Glasgow, and Arthur Ames Bliss of Philadelphia, who have dealt extensively with the pathological conditions found among the deaf mutes examined by them.

In my report, which I shall submit further on, I shall make no record of the ears examined.

First, because most of the children exhibit signs of middle ear involvement, as evidenced by thickened drums, and the prominent "short process" of the malleus.

Second, because it is difficult to determine what should be the proper appearance of a perfectly normal tympanum as observed among children.

Neither shall I make any record of different tests used in determining what hearing power may exist. I found among the congenital cases, when testing with a middle C tuning fork placed on the mastoid bone, the same result when I placed the fork on the back of the hand. The same with a loud-ticking clock. This led me to believe that their replies, when asked if they heard a noise, were governed by a sensory impression, and inasmuch as they had never heard sounds of any kind, it was impossible to determine with any degree of certainty, by any of the present known tests, whether or not any power existed in the auditory nerve. Besides, it requires considerable intelligence on the part of the child examined to understand exactly what is required. The same is true of the adventitious cases, especially when the deafness occurred at an early age.

Among pupils examined there were found 64 who were congenital mutes. Among the exciting or adventitious causes, meningitis and brain fever head the list with 23 cases.

Scarlet fever, -	-	-	-	-	12 cases.
Unknown, -	-	-	-	-	12 "
Falls during childhood, -	-	-	-	-	7 "
Typhoid and other fevers, -	-	-	-	-	12 "

Congestion of lungs,	-	-	-	-	1 case.
Colds,	-	-	-	-	4 "
Abscess,	-	-	-	-	3 "
Shock in infancy, spasms, diphtheria, small-					
pox, mumps, measles, paralysis of					
drums, each,	-	-	-	-	1 "
Quinine and whooping cough,	-	-	-	-	2 "
Sickness not given,	-	-	-	-	4 "

Congenital deafness I believe to be of rare occurrence, and when it does occur it depends wholly on some pre-natal disease, notably measles or other infectious diseases. That children can come into the world with malformations of the auditory apparatus I fully believe, but I think the statistics point to the rarity of such a condition. Changes in the labyrinthine wall and the partial or complete absence of the labyrinth are, no doubt, found *post-mortem* in both congenital and acquired cases. Of the former Mygind says, in his recent work on "Deaf-mutism": "In only one case was there reason to suppose the closing of the fenestra rotunda (or, as the abnormality in this and several other cases is called *absence of the fenestra rotunda*) to have been a congenital deformity." . . . "In all the other cases there is reason to suppose that the closing of the fenestra was caused by an ossifying process, the result of inflammation, exceptionally only of undoubted fetal origin, and most frequently arising after birth. This supposition is further supported by the circumstance that the closing of the window by an osseous mass is very frequently accompanied by the traces of unquestionable inflammatory processes in the tympanic cavity. This seems also to indicate that the inflammation of the tympanic cavity has been the primary process, the abnormalities simultaneously discovered in the labyrinth being the remains of inflammation propagated from the tympanum through the fenestra rotunda."

Of the absence of the labyrinth, Mygind says: "I have, however, in several of my works, proved that the partial, or complete absence of the labyrinth, or of parts of it, may be, and probably most frequently is, caused by the deposit

of osseous tissue in the labyrinthine cavity, which becomes thus more or less completely filled up, under which process the normal outlines may disappear entirely. Such a formation of osseous tissue is, without doubt, the result of a previous inflammatory process, that is, of an *otitis intima*."

Of the children examined at the State Institute, eighty-four were under the age of fifteen years, and fifty-five of the age of fifteen years and over. The pathological conditions observed in these children are as follows:

1. Those having hypertrophied tonsils, only 8.
2. Those having hypertrophied tonsils and adenoids, 49.
3. Those having hypertrophied tonsils, adenoids, chronic pharyngitis, or granular pharyngitis, 28.
4. Those having adenoids and granular pharyngitis, 4.
5. Those having adenoids and atrophic rhinitis, 2.
6. Those having hypertrophied tonsils and atrophic rhinitis, 2.
7. Those having hypertrophic rhinitis, 8.
8. Those having marked deflections of the septum, 4.
9. Those having nasal polypi, 3.

Among the congenital and adventitious cases, thirty-one of the former, and fifty-five of the latter have had either measles, whooping cough, mumps, scarlet fever, or several of these diseases before their admission to the asylum.

The results in this table correspond to those of Kerr and Bliss, and show that adenoids, hypertrophied tonsils, pharyngeal and nasal troubles exist in over seventy per cent. of the cases examined in different quarters of the globe.

This leads up to the consideration of the causes of deafness, independent of occasional cases of fetal absence of the organs of hearing.

I am of the opinion that the real explanation for the majority of these so-called congenital cases is, that they were subject, in the early months of life, to marked barometric changes, with resulting repeated attacks of "cold," and coincident inflammation, and subsequent hypertrophy of the pharyngeal or "third" tonsil, accompanied in many cases by an unrecognized subacute catarrhal or suppurative

involvement of the middle ear, and that they became deaf before the age of speech arrived.

Adenoid growths do not cause deafness in every case, but when they do, there will be found an interference in the natural breathing through the nose, and as a result of the mouth breathing, there will be a rarefaction of the air in the post-nasal space. This, according to Bucklin, "places a condition similar to a valve in the eustachian tube, which allows the air in the tympanum to be exhausted by efforts of swallowing and mastication, without allowing the pressure to return when the exhausting power is inactive."

This condition of exhaustion of air in the middle ear can produce a hyperæmia, followed by a subacute, acute, catarrhal, or suppurative inflammation, and yet I think the conditions, most commonly observed in connection with adenoids, among deaf-mutes, are the changes in the tympanum and ossicular chain, the result of attacks of subacute catarrh. This condition of things was reported on by J. Lockhart Gibson, at the Eleventh International Congress, and would seem to be a bar to successful operation among the very deaf children.

I have reached the conclusion from this examination that the majority of cases of commencing deafness in children depend on obstructive lesions in the nose or nasopharynx, and where the deafness is marked, or total, it is due either to interference of the ventilation of the middle ear, as stated above, or to inflammatory conditions propagated in the nose, or naso-pharynx, and extending to the middle ear, and thence to the internal ear (when the latter is involved), by continuity of structure. I have witnessed recently, in my own practice, a case of suppurative otitis media with mastoid complication, the result of an "adenoid" operation, and I am satisfied it was a simple case of extension of the inflammation, although Bucklin (*Medical Record*) advances an ingenious argument in opposition to this idea. We certainly have cystitis, the result of an urethritis, by the extension of the inflammatory condition,

and it appears to me that what can happen in other organs can happen in the ear.

The majority of aurists will, I believe, agree with me, that when the exanthematous and other infective diseases are properly treated, where symptoms of aural involvement supervene, fewer cases of total deafness will occur. That these diseases hold an important place in the causation of ear affections is beyond question.

During the course of acute otitis media we frequently have symptoms of meningeal irritation, or we may have a meningitis due to the extension of inflammation from the middle ear, and it is possible that a large percentage formerly called primary meningitis, really had their origin in the middle ear. In fact, St. John Roosa says, in his work on "Diseases of the Ear":

"Cerebro-spinal meningitis has been generally supposed to be the cause of many cases of deafness of the auditory nerves. That it frequently causes great loss of hearing and sometimes absolute deafness, no one with the least clinical experience will deny. A large proportion of the deaf-mutes of the present day are said to have lost their hearing in the course of cerebro-spinal meningitis. I believe, however, that, although the trunk of the acoustic nerve and the labyrinth may become diseased, and, perhaps, primarily in some cases, that the lesion of the ear that most frequently occurs in the disease, is an inflammation in the tympanum."

. . . "The clinical facts are against the theory of disease of the nerves. There is scarcely ever any paralysis in conjunction with deafness. It is hard to conceive a suppuration of the trunk of the acoustic nerve without any affection of the facial, and, although this absence of facial paralysis does not prove Voltolini's view, nearly all the cases of loss of hearing said to result from cerebro-spinal meningitis actually depend on inflammation of the membranous labyrinth. It assists us in believing that the first lesion may be in the tympanum."

Edmund D. Spear, in Burnett's "System of Diseases of the Ear, Nose, and Throat," says, in speaking of one of his

cases: "An attack of cerebro-spinal meningitis, so-called, was supposed to have been the cause of the loss of sight and hearing of one ear. The prognosis had been made very unfavorably, and the patient turned away untreated. Having persisted, however, in seeking for aid, it was learned from his history that the deafness, which was only partial, came on eight years after convalescence from the fever. Local treatment restored a normal amount of hearing, and the inference was very natural that the disease was entirely in the middle ear, and not labyrinthine or central.

"Again, in a child in whom the history of muteness and the negative signs in the middle ear gave conclusive evidence of labyrinthine lesion, the removal of adenoid tissue from the naso-pharynx and continued local treatment of the nasal passages and eustachian tube restored hearing and improvement in speech and vocabulary."

Involvement of the nerve may and does result from primary meningitis, which may or may not be followed by secondary middle ear disease.

Mygind ("Deaf-Mutism") says: "Clinical experience teaches us that the very considerable defects in hearing which appear during epidemic cerebro-spinal meningitis may have a dual origin, viz., inflammation of the middle ear, or an affection of the labyrinth. Loss of hearing from the former cause is, however, seldom so considerable or so lasting as to result in deaf-mutism. Deafness resulting from labyrinthine disease is more rare, but, at the same time, of more importance, since the loss of hearing is, as a rule, very considerable, often indeed total, generally affecting both sides, and nearly always permanent."

Heredity plays a part in the causation of deaf-mutism, but seemingly only in so far as to transmit the constitutional tendency to diseases of the middle ear.

The records of the Berkeley Institute show, among the present pupils, only seven cases among the congenital mutes with histories of consanguineous marriages. In but two cases, and these are brothers, are the parents deaf-mutes.

Some writers have gone so far as to suggest that legislative enactment be had to prevent the intermarriage of deaf-mutes and to compel them to seek hearing partners. This would seem a most unjust procedure, for, judging from the statistics at hand, more hearing children are born of deaf-mute marriages than deaf ones. If such legislation be enacted it would, perhaps, be a wise plan to incorporate in that law a clause prohibiting the marriage of tubercular people, for there is certainly greater danger of having a tubercular race than there is of having a race of deaf-mutes.

While aiming at the prevention of deafness it would show infinitely more wisdom to compel physicians, nurses, or parents to report cases of ear involvement during the course of infectious fevers to a board of health, in conformity with similar laws formulated in the State of New York for the prevention of blindness. Such a plan seems to suggest itself from reading the record of ear cases treated by Walker Downie in the Royal Hospital for Sick Children, a report of which appears in *The Journal of Laryngology, Rhinology, and Otology* of September, 1894. He says, "Of the 600 cases there were 501 cases of middle ear disease (404 with and 97 without discharge), that is, in 83.5 per cent." Of this number:

"131 cases, or 26.1 per cent., originated during an attack of measles.

"63 cases, or 12.6 per cent., originated during an attack of scarlet fever.

"15 cases, or 3.0 per cent., originated during an attack of whooping cough.

"3 cases, or 0.6 per cent., originated during an attack of mumps.

"147 cases, or 29.7 per cent., were catarrhal in origin.

"101 cases, or 20.0 per cent., originated during the eruption of teeth.

"8 cases, or 1.6 per cent., were syphilitic in nature."

It will thus be seen that a trifle over 38 per cent. of the cases are the result of measles and scarlet fever, and, as the same author says, "does not indicate the number of cases

in which the ear is affected during the currency of those diseases, but rather points to the proportion of chronic ear affections which follow on them."

Taking the figures and statements of Mr. Downie as a basis, the best plan which suggests itself for the prevention of ear involvement is the rational treatment of the nose, throat, and ears, during the course of the infectious fevers. The frequent cleansing of the nose and naso-pharynx with some of the alkaline, detergent solutions, warmed, of course, and followed by a spray of some of the hydrocarbon oils, with which can be incorporated menthol, eucalyptus, thymol, oil of Scotch pine, etc., according to the user's fancy. The objects sought are, of course, relief from the secretions and unimpeded nasal respiration. Should the middle ear become involved and the use of the Politzer bag afford no relief, a free *paracentesis* of the drum should be made without delay and the contents evacuated, and the ear then treated according to the usual methods in such affections.

If there are obstructions to nasal respiration, either hypertrophied turbinated bodies, polypi, deflections of the septum, hypertrophy of the pharyngeal or the faucial tonsils, they should be removed at once, especially if associated with commencing deafness.

Several cases are on record of improvement in hearing among deaf-mutes due to the removal of "adenoids," and while the chances of favorable results are, perhaps, in most cases negative, the operation should, nevertheless, be attempted; first, because it is necessary to have the upper air passages free from obstruction before attempting to have pupils taught the articulation method. Second, because of the influence which obstructed nasal respiration (especially adenoids) has on the general health; and third, because there is a possible chance of benefit to the hearing.

The field of surgical treatment among the deaf-mutes is comparatively a new one, and it is to be hoped that improved methods of treatment will increase the hearing power of this class of cases.

MATERIA MEDICA AND THERAPEUTICS OF THE EYE.

BY CHAS. C. BOYLE, M. D., NEW YORK.

CALC. CARB.—Sensation as if sand were under the eyelid. Inflammation of the eyes with agglutination of the lids. Swelling of the lids with redness, and nightly agglutination. During the day they are full of mucus; also heat in the eyes with smarting pain and lachrymation. Sensitiveness of the eyes to the light.

Clinical.—This remedy I use in scrofulous affections of the eyes in children, especially during dentition. In prescribing it I am guided more by the general condition of the patient than by the eye symptoms. The cases that I most frequently use it in are those that have phlyctenules, pustules, and abscesses of the cornea. Patients calling for this drug are mostly children who sweat profusely, especially about the head; have enlarged cervical or submaxillary glands; teething. It is also useful in eye troubles due to working in water.

CALC. PHOS.—The keynote for this remedy, or what I use as a guide in prescribing it, is the enlarged tonsils; these you generally find in children who have a scrofulous constitution; a condition of malnutrition, especially affecting the osseous tissues.

Clinical.—I have cured parenchymatous keratitis with it, when the cornea was very hazy from infiltration, slight redness and very little pain. I have used it in other eye troubles of children, which were dependent upon scrofula.

I selected this remedy in all these cases, because the patient's tonsils were enlarged.

CALC. HYPOPHOS.—This remedy is used in the same class of patients as those drugs immediately preceding, but the hypophosphite is called for in those suffering from malnutrition, they are either emaciated or have other symptoms indicating a low state of vitality.

Clinical.—I have often seen it retard the breaking down of the entire cornea, where an abscess or ulcer had formed, accompanied by pus in the anterior chamber (hypopyon).

CALC. IOD.—This is another remedy belonging to the same general class of patients; I usually take as my guiding indication an enlargement of the glands, especially the cervical.

Clinical.—I have found it to be most useful in the different forms of keratitis, which occur in scrofulous patients, especially phlyctenules or pustules, accompanied by redness, lachrymation, and very marked photophobia.

CANNAB. SAT.—The indication for this remedy is the vascular condition of the cornea.

Clinical.—In parenchymatous keratitis, where the cornea is opaque and very vascular, accompanied by more or less redness of the eyeball, with pain and photophobia, I consider it the remedy above all others. The redness, pain, and photophobia are not as marked as in *aur. met.*, but the vascular condition of the cornea is more so; in fact, where it is present, I prescribe this remedy in preference to any other, and it has seldom failed me. Of course, we all know this disease requires time to effect a cure, but with the aid of this remedy, I have seen its progress rapidly checked and the cornea cleared in a comparatively short time.

CARBON SULPH.—The curative sphere of this remedy in eye diseases appears to be limited to the optic nerve. It has paleness of the internal segment or the optic nerve; progressive atrophy of the optic nerve; neuritis; disk pale and hazy; veins engorged; arteries contracted; central scotoma for red; vision misty.

Clinical.—This should be an excellent remedy in retro

bulbar neuritis, but I cannot speak from experience. I have tried it in several cases, but with no apparent benefit.

CAUSTICUM.—Has a feeling of sand in the eyes. Burning, with dryness and photophobia. Dryness in the eyes in the morning with stiffness. Biting with pressure and heaviness, with redness of the lids. Itching, especially of the lids. Heaviness of the upper lid, as if it could not be raised easily. Difficulty in opening the lids < in the morning. Photophobia and constant inclination to wink. Dimness of vision ; like a veil before the eyes.

Clinical.—This is a good remedy in loss of power of the muscles of the eye, especially if due to taking cold. I have prescribed it in these cases, and also in cases of asthenopia, where the patient complained of the feeling of sand in the eye. It is said to be useful in checking the growth of cataract. I have used it with benefit to the patient's vision, in these cases, but the cataract did not change any. *I do not believe cataracts are curable by remedies, or by any other means, except their removal*; their growth may be retarded, but they cannot be caused to disappear.

CEDRON.—Redness of the eye, with protrusion, and aching extending to forehead. Smarting and burning, with lachrymation. Intermittent neuralgia. Ciliary neuralgia ; neuralgia of the supraorbital nerve, and also whole right side of face coming on about 9 A. M. and lasting a few hours. Neuralgia supraorbitalis with malarial history. Severe pain in eyeball, with radiating pain around the eye, shooting into nose, causing flow of scalding water from eyes and nose.

Clinical.—I have found it a useful remedy in neuralgic pains, especially over the left eye. One case of keratitis that had resisted other remedies yielded quickly to it ; I prescribed it for the pain over the left eye, periodic in character, being worse every other day ; patient had had malaria.

CHAMOMILLA.—Eyes swollen in the morning and agglutinated with purulent mucus. Pressure in orbital region.

Sensation as if the eyeball were compressed from all sides with obscuration of vision.

Clinical.—This is a useful remedy in various forms of inflammation of the eye, where the patient is whining, restless, peevish; if a child, it wants to be carried. Piteous moaning because cannot have what it wants. I have used it frequently in phlyctenular and pustular inflammation of the cornea, generally accompanied by redness of the eye, with pain, lachrymation, and photophobia.

CHINA.—Pain in the eye on motion, with sensation of mechanical hindrance (*kalmia*). Lachrymation, with crawling pain in the eyes and on the inner surface of the lids. Darkness before the eyes; vision of black floating points.

Clinical.—Has been used in retinal asthenopia with transient blindness or flickering before the eyes after sexual excess. Hemeralopia; neuralgia about the eyes. Supra-orbital neuralgia < by slightest touch. Weakness of vision and neuralgia associated with spinal irritation.

I have used it and the various combinations of the product of cinchona with other drugs, as the chin. et. fer. cit., chin. ars., and chin. mur., in various eye troubles, as spots before eyes, or poor vision from anæmia; in this trouble I have found the chin. et. fer. cit. very useful. The chin. ars. is a most excellent remedy in children, who have ulceration of the cornea, with redness, and great deal of photophobia; symptoms are worse every other day: generally have a malarial history or live in malarial district. Chin. mur. is used in ciliary neuralgia, complicating iritis or other eye troubles, in cases where it does not respond to the apparently indicated remedy.

CICUTA VIR.—Eyes staring. Gray fog before the eyes. Pupils alternately dilated and contracted; eyes sensitive to light. Objects seem double.

Clinical.—I have prescribed this remedy for children, who had periodic strabismus, with benefit, but never cured a case alone with it, as the majority of cases are due to refractive troubles, which have to be corrected by glasses.

CINA.—Sickly look about the eyes, with pallor of face.

Pulsation of superciliary muscle, a kind of convulsion. Children wake in fright. Children become fretful, peevish and cross.

Clinical.—Asthenopia; vision becomes blurred on attempting to read. Strabismus from worms.

In cases of phlyctenular and pustular inflammation of the cornea, in which the child is peevish, fretful, and crying out in its sleep, all of which symptoms point probably to intestinal worms. This remedy has relieved or cured the cases for me more than once. I use santonine in the forms indicated.

CINNABAR.—Pain from right lachrymal duct around eye to temple; *from left inner canthus across brow*. Drawing from right inner canthus across malar bone to ear.

Clinical.—Kerato-iritis and ulcers. This remedy I have prescribed wherever I have found the characteristic pain around the eye, and seldom it fails to relieve the patient, no matter what the trouble is. I have used it in keratitis, kerato-iritis, and iritis; also in glaucoma. I consider it almost a specific for gummata of the iris, and syphilitic iritis. Have cured the iritis and absorbed the gumma in little over a week's time in some cases. The pains in this remedy, as in all the preparations of mercury, are generally worse at night.

CLEMATIS.—Eye red, glistening, hot, and dry. Inflammation of white of the eye with lachrymation. Burning, as if fire streamed out of them. Biting, burning pain; sensitiveness to air; sensation of a veil before them; pupils contracted. Pressure in orbits on moving eye.

Clinical.—Said to be useful in syphilitic iritis and with adhesions. Have never used the remedy.

COMOCLADIA.—Pain in right eye at 3 or 4 P. M., with pain as if it was larger and protruded more than left; eyes feel heavy, large, and painful; pressing out of head, as from a pressure on top of eyeballs moving them downward and outward.

Clinical.—I have prescribed this occasionally in asthen-

opic troubles of the eye, on the symptom of the eye feeling large and protruded; have found it beneficial.

CONIUM.—Burning in eyes. Lids seem pressed down with sleepiness. Burning under inner surface of lids; pain across eyebrows; misty vision.

Weak vision; with dazzling, vertigo, and general debility < in arms and legs, so that he staggers. Fatigue from reading. Sluggishness of adaptation of accommodation.

Clinical.—I have used it with benefit in asthenopic symptoms from straining the eyes, with weakness of internal recti, heaviness of the lid, and some photophobia but no redness. It has been used in inflammatory conditions of the cornea, where there was great photophobia, but I have not found much benefit from it in such cases. It has been used for cataracts in old people with apparent benefit.

CROCUS.—Feeling in eyes of biting as from smoke. Pain with sore burning after reading, with dimness so that he must frequently wink. Feeling as if she had wept much. Feeling as if water were coming into eyes > open air.

Twitching of lids as if something must be wiped from right eye.

Frequent inclination to wink and wipe the eyes as if a film of mucus were over them (euph., puls.). Inclination to press lids tightly together. Feeling of cold wind blowing against the eye (fluor. ac., medor., thuja).

Clinical.—I have prescribed this with relief in a number of cases of asthenopic troubles with some or all of the above symptoms; it is a remedy that should be used more than it is.

MATERIA MEDICA OF THE EAR.

BY WM. E. ROUNDS, M. D., NEW YORK.

ARNICA.—*Pain in the cartilage of the ears as if the parts had been bruised.* Heat and burning of the lobule of the ears. Throbbing, boring pains in the ear extending to the jaws as if the whole of that side of the head had been pounded. Dull stitching pains as if the internal parts of the ears were sore. Fine pustular eruption on auricle, which exudes a sticky moisture and afterward forms a thick crust.

Arnica is prescribed for pain and inflammation caused by bruises, as a matter of course. It should be useful in some cases of eczema of the auricle with a fine, vesicular red eruption, something like rhus, but not so fierce or painful.

ARSENICUM ALBUM.—Tearing, burning pains in the external auditory canal; tickling pains in the external auditory canal as if something alive were crawling in it, with a burning ichorous discharge, causing a burning itching eruption of the auricle. Dry, scaly eruption upon the auricle. Red pustules upon the auricle and in the membranous portion of the external auditory canal, changing to ichorous, crusty, burning, and spreading ulcers. Discharges from the ear of thin, fetid, ichorous, bloody pus and mucus with burning pain and distressing tinnitus—*Paroxysms of pain* with distressing roaring. *Arsenicum* is a valuable remedy in the treatment of ear diseases. It is useful in chronic suppuration of the middle ear and eczema of the auricle. It has also proven of great benefit in furuncular and diffuse inflammation of the external auditory canal as the result of chronic malaria; especially has the iodide

of arsenic proven useful in these cases, with glandular enlargements of the throat and nose with a chronic ichorous discharge from the nose. The nasal symptoms are: *Dryness of the nasal passages*, or else, *a discharge of a thin, acrid mucus, which makes the nose and upper lip red and scaly*. Chronic coryza with much sneezing and ulcers upon the nasal septum and turbinated bones. Chronic catarrh in pale, anæmic sufferers from malaria. Arsenicum has been useful to me in the treatment of chronic suppuration of the drum complicated with disease of the mastoid. The symptoms leading to the remedy were the great exhaustion, anæmia, pale, wax-like skin, the early morning aggravation of the pain, and extreme restlessness.

ASAFETIDA.—Pressure in the ears, diminished hearing, accompanied by a purulent discharge, *a severe aching tension in the temporal bone, a pressing-out sensation* as though a plug were being forced out through the ear. The discharge from the ear is a thin, fetid ichorous pus.

The ear symptoms of *asafetida*, as shown in the provings, are meager, but the remedy has proven valuable in the treatment of necrosis of the temporal bone in connection with *mastoid disease*. It should be thought of in *mastoid disease*, where the pain is located in temporal region, and in petrous portion of the temporal bone, with the characteristic pushing-out sensation and the discharge indicating a deep-seated bone inflammation. Aggravation at night and from warm applications, but relief from pressure, also point to this remedy.

AURUM.—Tension in the ears, roaring in the ears with swelling of the parotid gland. Caries of the mastoid process, fetid otorrhœa—hardness of hearing and affections of the ears from syphilis and the abuse of mercury. In spite of the scarcity of symptoms referable directly to the ear, aurum has proven a valuable remedy in deep-seated ear trouble, in chronic mastoid disease with a scanty, ichorous, offensive discharge, and deep-seated bone pains with nightly aggravation. The pains are deep-seated, of a boring or pressing character, described as a feeling as though

a nail or bolt were being driven or pushed into the temporal bone. This remedy acts as an antidote to mercurial poisoning, and should be used in all chronic cases; in which the mercurial preparations have been used, to the extent of producing constitutional symptoms. The remedy is also of most decided value in mastoid disease of inebriates, often relieving the whole train of symptoms, both general and local. The nasal symptoms are more characteristic than those of the ear. Caries of the nose, inflammation of the nasal bones which extends to the superior maxillary. Ulceration of the nostrils with an exceedingly offensive discharge and great sensitiveness, large offensive crusts in the nostrils, which obstruct the breathing and which are dislodged with difficulty. Acute fluent coryza with severe pains in the bones of the nose and face. The bones of the nose and face become painful and swollen.

BARYTA CARB., BARYTA IOD., AND BARYTA MUR.—Drawing pains in the ears; tearing, boring pains of not a severe character in and behind the ears. Stitches in the ears sometimes very violent, throbbing and pulsating sounds in the ears. Pain in the ears, with painful swelling of the glands of the throat. Cracking sounds in the ears when blowing the nose and when swallowing; loud reports in the ears like the popping of a toy pistol; roaring and buzzing in the ears and sounds like the ringing of bells. *Pain in the ears when blowing the nose.* Hardness of hearing. Hardness of hearing of children with enlarged tonsils. Sensation as though he were breathing through the ears, Rawness and roughness of the pharynx, worse during empty swallowing and when eating or drinking. The throat feels sore and swollen and is tender to the touch externally. The tonsils are swollen and tender and the aching pain extends to the ears. Chronic sore throat with hardness of hearing and frequent earaches. Baryta is especially useful in the treatment of children and old people. In children the symptoms point to acute scrofulous inflammation of the glands of the throat, and nose, and the ear becomes affected chiefly from contiguity of the eustachian tube.

In old people this inflammation has passed into the chronic stages with atrophy of the mucous membrane and abnormal patency of the eustachian tube. It was for this condition that baryta was first prescribed in the ear clinics of the New York Ophthalmic Hospital by Professor Houghton, more than twenty years ago. The symptoms were hardness of hearing, pale, thin throat, atrophy of the nasal mucous membrane, and an unnatural patency of the eustachian tube—a condition of things for which we now more often prescribe kali mur. During this time, while prescribing baryta mur. in a routine way, I found that in many cases in which the remedy was continued, week after week, an apparent aggravation was produced. The patient would complain of sore throat and pain in the ear when swallowing or blowing the nose. I then began to give the remedy in more acute cases and found it was more often called for in young patients, especially in children suffering from naso-pharyngeal glandular hypertrophy, with pain in the ears, when swallowing and blowing the nose. I now use the baryta iodide for the more acute conditions and the baryta mur. for the stage of atrophy. *Children who go around with their mouths open and who "talk through their noses."* *Stupid-appearing children who are hard of hearing.* I think the higher potencies (12x or above it) more suitable as a rule for the chronic cases, but for the more acute conditions I use the 6x preparation.

BELLADONNA.—Pain in the ears; stitching pains in the ears extending to the throat and teeth; violent stitching pains in the parotid gland extending to the ears; stopped feeling in the ears as though the external auditory canal were stopped. Sharp pains in the ears occurring during eructations from the stomach. Violent pressing pains in the mastoid processes. The mastoid is red and swollen and very tender. Roaring in the ears, acute inflammation of the ears with heavy throbbing pain, hardness of hearing and tinnitus aurium after having the hair cut. Belladonna is a valuable remedy in the treatment of ear diseases, and will, in the great majority of cases, be prescribed on account

of the throat symptoms. Roughness of the throat, dryness of the throat with a violent burning pain; inflammation of the throat and fauces with phlegmonous swelling and violent fever; sore throat with sense of constriction and dryness with difficulty of swallowing water; sensation as of a lump or ball in the throat, which he tries to dislodge by swallowing. Belladonna is most often called for in subacute inflammation of the middle ear and quite naturally follows aconite, *severe throbbing pains in the ear with great sensitiveness to noises, although he is hard of hearing*. Sudden sharp pains in the ear that disappear suddenly, in chronic and subacute catarrh of the drum. This remedy is also often of value in chronic suppuration of the drum and mastoid process with threatened meningitis.

Itching of the auricle, sometimes biting, burning, or stinging, with a sense of increased heat and the appearance of small pimples. Painless beating, with pressure and buzzing in the ears, with dryness and feeling of coldness in the external auditory canal. Lancinating pains through the drum with a sensation as if the ear were full, stitches in the ears. Dryness of the mucous membrane of the nose, with scanty secretion of a yellow or greenish mucus. Dryness of the throat; sensation in the throat which compels him to hawk, with dropping from the posterior nares. Inflammation of the tonsils and pharynx, with fiery redness of the throat with a sensation as if a painful lump in the throat, with stiffness of the neck and great hoarseness. This remedy should be useful in cases of subacute catarrh of the drum with pain in the region of the liver and *severe aching in the back and loins*.

BORAX.—Pain the ear; sensitive to pressure behind the ear; itching in the ears; ears inflamed and hot; swelling of the ears, with discharge of pus from the external auditory canal; soreness in the ear when inserting the finger into it; discharge of pus from the ears with lancinating headaches; discharge of offensive pus from the ears, which excoriates the auricle and causes it become swollen and red; sudden stoppage of the ears. Roaring in the ears and buzzing,

with hardness of hearing; itching and tingling in the nose, with ulceration of the septum; a quantity of dry crusts in the nose, which reform soon after removal; the nose bleeds easily; catarrh of the posterior nares, with hawking of thick, tenacious, blood-streaked mucus. I have found this remedy useful in the treatment of the so-called "dry catarrh," and have used it as an internal remedy as well as locally, in the form of a solution, and also as a pulverized preparation. I often use a solution of five to ten grains to the ounce of warm water as a wash for the nares, applied by means of the post-nasal syringe, and in chronic suppuration of the drum with troublesome granulations, the drug finely pulverized and dusted upon the dried granulations acts very well, though I prefer to use the boric acid.

ASSOCIATED PERIPHERAL PARALYSIS OF THIRD AND SEVENTH, WITH IMPLICATION OF FIFTH CRANIAL NERVES.

BY JOSEPH T. O'CONNOR, M. D., PH. D., NEW YORK.

AS neurology owes no inconsiderable debt to ophthalmology, it will not be amiss for a neurologist to record in an ophthalmological journal the notes of a case of more than ordinary interest to the ophthalmologist.

On January 21, 1895, at the College Dispensary, during my hour of attendance, T. H., aged thirty-two, coachman by occupation, came under my observation. The most noticeable objective symptoms were ptosis of right eye and paralysis of the same side of the face. The association of the two conditions brought up at once suspicion of multiple cerebral lesions. Upon further examination all the extrinsic muscles supplied by the third nerve were found paralyzed, but the pupil was apparently strongly contracted. A dense white opacity occupied the upper outer quadrant of the cornea, and by looking beneath it there could be seen an opening in the iris, hyperbolic in outline, a small part of the opening uncovered by the opacity being visible, and thus appearing as a contracted pupil. The cause of this was an iridectomy made several years ago. Ptosis was not complete, since a narrow crescent of sclerotic was visible when the patient's face was at rest.

The patient being asked to close the eyes tightly and to wrinkle the forehead, neither action could be carried out on the right side, and thus was seen the uncommon condition of inability to close as well as to open the eye. The

ordinary tests for seventh nerve paralysis showed existence of that condition in the three great divisions of the nerve, but without any impairment of the sense of taste, and with no alteration in the salivary secretion. Further, there was complete absence of faradic response by the facial muscles on the paralyzed side.

There was, therefore, peripheral paralysis of seventh nerve.

The patient had come to the dispensary on account of great pain in the temple, parietal region, and cheek of the affected side, so that in all probability the fifth nerve was also affected.

In two days the patient returned, ptosis being now absolute, and the upper lid was dark in tint, while pressure above and behind the eyeball gave rise to decided pain.

The trouble had begun with pain, then came ptosis, and next the dropping of the side of the face, the succession being a rapid one.

Diagnosis.—Peripheral neuritis of third, fifth, and seventh nerves, rheumatic in origin in a syphilitic subject, he having had syphilis fifteen years ago. Syphilitic neuritis of peripheral, and especially of cranial nerves is well known, and it may well be that syphilis was in this case the chief factor in the production of the diseased condition.

The intention in publishing this case is not only to record an unusual association of symptoms, an association that might puzzle or even lead to erroneous diagnosis a beginner or one making a hurried examination, but also to urge upon the ophthalmologist the importance of testing in every case of third nerve affection the action of the orbicularis palpebrarum, the frontalis and the corrugator supercilii, especially when ptosis, complete or partial, is present.

In connection with the foregoing, attention is called to a case lately recorded by Hanke (*Wiener klinische Wochenschrift*, 46, 1894), in which there was almost total ophthalmoplegia externa in both eyes, occurring in early infancy, or perhaps congenitally. In this case, at the age of twenty-

six, there was added paresis of the levator palpebræ superioris, and also of the eye facial muscles. The remaining distribution of the seventh nerve not being affected, the trouble in the orbicularis and frontalis could not have been of peripheral origin, and can only be explained, as Hanke shows, by origin of the fibers for the oculo-facial group of muscles from the posterior part of the nucleus of the third nerve. These fibers, as Mendel has demonstrated in rabbits and guinea pigs, do not pass into the trunk of the third nerve, but pass down, probably, *via* the posterior longitudinal bundle, to join the trunk of the seventh.

Professor A. Koshewnikow of Moscow reported, in *Neurologisches Centralblatt*, No. 19, 1894, a case of acute poliomyelitis anterior in which the cervical portion of the cord was specially affected. Besides atrophy and paralysis of the muscles of the neck, of upper half of trunk, and of arms, the levator palpebræ on both sides were paralyzed without implication of any other eye muscles, so that the paralysis was of a single branch of the oculomotorius. Such an isolated affection leads to the view that it is due to a nuclear trouble, and that, besides poliomyelitis anterior, there was also an acute polioencephalitis present. An especially interesting symptom was a paralysis of the orbicularis palpebrarum and corrugator supercilii of left side, and it will be readily admitted that such a limited paralysis in the facial distribution is likewise of nuclear origin. In this patient, one and the same disease-process had affected at the same time a part of the third nerve nucleus and the upper division (*sic*) of the facial nucleus which has relation to motion of the eyelids. And this case is, indeed, the first offering such a characteristic combination of single paralyzes, and so is a clinical support to Professor Mendel's theory that the division of the facial nucleus (*sic*), which gives origin to the upper branch of the facial nerve, forms the posterior part of the oculomotorius nucleus.

Hughlings Jackson reported in *Lancet*, July 15, 1893, three cases of bilateral ophthalmoplegia externa in which

paresis of the orbicularis palpebrarum on both sides was observed. J. finds his explanation of the latter symptom in Mendel's researches, and refers, for clinical and also anatomical support of this theory to the "Study of a Case of Bulbar Paralysis," by Tooth and Turner (*Brain*, winter part, 1891), in which, upon microscopic examination, the important fact was found that the facial nucleus was diseased, and especially that the "knee" of the nerve was wholly degenerated, but the emerging root was only thinned. During life (among other symptoms) the lower face was paralyzed, but the distribution of the "eye facial" was not affected, neither was any trouble observed during life or *post-mortem* in the first, second, third, fourth, or sixth nerves or their nuclei.

W. R. Birdsall, in an article on "Ophthalmoplegia Externa," quotes a case from H. Bruesgin (source not given) in which, in 1876, bilateral ptosis and slow but regularly progressive paresis of all the external ocular muscles of left eye occurred, with perfect preservation of vision, power of accommodation and pupillary reaction, and a normal fundus. The lids could not be completely closed, indicating involvement of the orbicularis palpebrarum. Birdsall, whose paper was written in 1884 and not published until February, 1887 (*Journal of Nervous and Mental Diseases*), could only explain the latter symptom upon the theory of implication of "the knee of the facial, whose first branch was affected." He was unaware, at the time, of any other mode of explanation, for Mendel's experiments had not then been made.

The results of Mendel's experiments on rabbits and guinea pigs have not been accepted by all neurologists as applicable to man, and Oppenheim (the most recent author of a text-book on neurology) distinctly refuses to do so. While the results of those experiments are of great value in explaining the anatomical differences underlying a case of Bell's palsy and one of hemiplegia involving the face, they are of still greater importance in the study and diagnosis of nuclear ophthalmoplegias. And, from observation made since the case detailed at the beginning of this paper,

I am satisfied that cases of nuclear ophthalmoplegia have been examined without any attempt at determining whether or not the orbicularis palpebrarum, the frontalis, and the corrugator have been affected. Notwithstanding the want of attention to this point on the part of examiners, several cases have been reported within recent years that not only give support to Mendel's conclusions as applied to man, but also show the need of carefully examining the eye facial, so-called, for evidences of trouble in different forms of central disease.

Although enough has been quoted from the literature to give clinical, as well as anatomical, support to Mendel's theory, more is yet needed to assure its wider acceptance. Accumulated cases in which the action of the protective muscles to the eye (orbicularis, frontalis, and corrugator) has been tested, will give a mass of testimony that will be beyond cavil, while the results of autopsies, even though the latter be few in number, will, I believe, render the theory impregnable. Even without the theory, the routine examination of the muscles mentioned will undoubtedly enlarge our knowledge of clinically associated cranial nerve palsies.

PTERYGIUM.

BY HAYES C. FRENCH, M. D., SAN FRANCISCO.

IN scanning the pages of this journal from its first issue to its last, we have been unable to find a single distinctive article upon the subject of this paper, and the paucity of literature on the subject in the whole domain of ophthalmology is somewhat remarkable. He must have been fortunate indeed who, having made many operations for pterygia, has escaped the mortification, in some instances, of complete, or, at least, partial failure, in final results. We have chosen this theme because on the Pacific Coast—where we have our long, dry seasons in which all verdure is, for the time, cut off unless sustained by artificial irrigation—the trade winds constantly blow clouds of dust into the eyes of unhappy denizens, and in consequence pterygium is a disease of much greater frequency than in the East, where frequent summer showers maintain the general verdure, thus preventing the insufferable reflection from the arid earth, also laying the dust. In my experience, Italians seem to have been the most frequent sufferers from the disorder, comprising largely fishermen and gardeners, and next to them railroad employees, and then farmers, or ranchers of all nationalities. In the cities or incorporated towns a thorough system of street-watering may lessen somewhat the frequency of the disease. It would be interesting to gather statistics showing the relative frequency of the disease on the Pacific Coast as compared with the Atlantic States.

The limit of this paper will not allow of an extensive dis-

cussion of the pathology of pterygium, and we desire more particularly to dwell upon the most practicable methods of surmounting the difficulties that have ever attended efforts at relief. Though these hypertrophic changes, as a rule, choose the nasal side of the cornea over the insertion of the internal rectus in the sclerotic, it is not at all infrequent to find double pterygia of both eyes, covering alike the course of the external and the internal recti muscles, though we have yet to see a case involving the superior or inferior recti muscles. So far as my observation has gone pterygia grow much more rapidly here than in the Northern and Eastern States, and, like our vegetation, assume greater proportions, approaching more frequently the *pterygium crassum* of the older writers. Not only is the growth more rapid and exuberant but the corneal epithelium seems to be more intimately and destructively involved in the pathological process, thus rendering an operation more difficult in performance and less liable to succeed. We cannot dwell upon the pathogenesis of the disease. Its characteristic, almost constant location upon the most exposed portion of the conjunctiva—that portion not covered by the lids except in sleep, and momentarily during nictitation—shows this necessary exposure to constitute at least predisposing cause of the disorder, and to this may be added the determination of blood to the dominant internal recti muscles, which not only antagonize their external neighbors, but, in addition thereto, sustain the necessary convergence for near vision. The insertion of the internal recti at a point nearer the limbus and at a point which brings the muscle into more intimate relation to the conjunctiva, may be another reason why this is the chosen seat of pterygium. For the exciting cause we can look to any source of persistent irritation, such as particles of sand or minute impurities coming in contact with these exposed parts by whatever means, and the glare and heat of a tropical sun, especially when reflected from light pavements or an arid desert, and in, short, any case that promotes and maintains hyperæmia of the conjunctiva in this region.

Treatment.—This is the question of paramount interest. How can it be made successful? Almost innumerable expedients have been adopted to this end. Our enthusiastic high potency practitioners have claimed wonderful results from the persistent use of single and highly attenuated remedies, and, if no mistake has been made in the diagnosis, some of these reported cases have been highly creditable to our school of practice. *Zincum metallicum* seems to be homeopathic to pterygium, and in cases where the cornea has not been too much encroached upon, and the disease is not too aggressive, there is no objection to giving this remedy, to the exclusion of all others, an opportunity to demonstrate its superiority over the knife.

The writer has frequently seen incipient pterygium arrested, and finally dissipated by the internal use of metallic zinc alone, or in conjunction with the sulphate in solution, instilled into the eye twice daily. It requires patience to obtain these results, and it is a good plan to begin with zinc met. 6th or 12th, given daily for a month or so, and then at longer intervals, increasing the periods in length and also raising the potency as the growth diminishes, following the treatment up for months. Dr. G., a very careful and conscientious general practitioner of this State, who has had large experience in my college clinic, and could not be mistaken in his diagnosis, reports a well-developed pterygium as dispersed completely by the use alone, of zinc. met. 6th, at intervals of three days to a week for the period of a year or more, with no recurrence after the lapse of another year.

As a rule, however, surgical intervention will be called for in a majority of these cases, and few diseases have been subjected to a greater variety of treatment with more varied results. Strangulation by ligating the vessels near the base, transplantation and removal by incision, and destruction by means of the galvano-cautery, all have had their enthusiastic advocates, and scores of modifications of these methods have been urged at different times as offering each its superior advantages. We have tried them

nearly all and in none have found the perfect success desired, in all cases. While some have advised the careful dissection of the apex of the growth from the corneal epithelium as the rational and successful method, others with equal enthusiasm have urged the necessity of tearing this portion of the growth away from its attachment after it has been dissected up to the limbus. Having tried both methods, I am satisfied that neither has the exclusive advantage over the other. If the apex is loosely attached it will often be found to be the superior method to detach it by means of a blunt instrument, as a strabismus hook, having first dissected the meaty portion from the scleral connection, but when the apex is found firmly attached, dipping down into the substance of the cornea, the tearing method will often leave a roughened and suppurating surface, and healing will be slow, thus favoring secondary growths. In these cases a careful dissection with a sharp knife will be found superior, leaving a clean though deep cut which quickly heals. The chief object to be attained is the removal of the hypertrophied tissue with as little loss of conjunctiva as possible, and as complete a breaking up of the circulation as can be accomplished. Desmarres advocated transplantation, while Szokalski fathered the method by strangulation. Pagenstecher advised the dissection of the growth from its corneal, and in part from its sclerotic attachments, and that it be allowed to atrophy while the edges of the conjunctiva were united by sutures beneath the partially detached pterygium. In large ptergia Knapp advocates the splitting of the hypertrophied mass longitudinally after its detachment from the cornea, inserting the upper portion in a gap made in the conjunctiva above the base of the pterygium, and the lower portion in a similar incision below the base. He also united the conjunctival edges by means of sutures, having first dissected it up freely from its scleral connections. Szokalski's operation for strangulation is as follows: "After dissecting up the pterygium, he takes a silk thread armed at each end with a delicately curved needle, and pierces the apex with both needles so as to in-

clude it in a small loop ; then turning the needles inward, he brings them out at the base of the growth, one near the upper and the other near the lower margin. The two ends are then tied in a tight knot, and thus the apex of the pterygium is turned inward toward the base, and the other is strangulated by the knot." It is claimed both for this and for Knapp's operation that a recurrence is less apt to follow than when excision is employed. Since cocaine has been introduced into this branch of surgery, in the writer's experience there has seemed to be a greater tendency to the proliferation of conjunctival tissue after the operation than occurred under general anæsthetics. It has long been a question in my mind whether the ideal bloodless condition of the parts under cocaine is not followed by a vascular reaction that is responsible for the annoying secondary proliferations that have, of late, proven so unpleasant both to the surgeon and his patient.

Thorough asepsis certainly adds greatly to the chances of success whether cocaine is employed or not, and where there is an evident tendency to great congestion, iced compresses followed up for thirty-six or forty-eight hours after the operation will often be found of great benefit. Dr. G. C. Savage of Nashville, in the *Ophthalmic Record*, 1893, claims that the return of the growth after operations is caused by part of the ocular conjunctiva attaching itself to the denuded cornea, and advises making a vertical incision about one-eighth of an inch above and another below, and one-twelfth of an inch from the limbus, in the conjunctival margins of the wound, after the removal of the pterygium, then bringing the points together with sutures across the gap, thus keeping them from contact with the cornea. He also says, "for the best results in the way of clear cornea, the corneal part of the pterygium should be removed by traction, never by dissection." Dr. A. G. Hobbs reports in the *Ophthalmic Record*, of June 1894, two pterygia removed by the galvano-cautery. He says they were extremely vascular and muscular, so he first removed them by the knife in the usual way, and then seared the divided edges with the

cautery blade, and reports good results in these cases, also in fourteen other cases treated by the cautery alone he says the results were good. For some time I have employed the cautery for the removal of secondary growths following pterygium operations, and when not too large have successfully performed the primary operation in this manner, the first time in the case of a Chinaman, in which the result was everything that could be expected, though a similar growth on the opposite eye after thorough and careful removal by the knife had recurred again and again, requiring much time and many operations for its final destruction. I am strongly of the opinion that the coming treatment of pterygium will be largely, if not exclusively, with the galvano-cautery.

Noyes, Wurdemann, and many other oculists of note have called attention to the necessity for the removal of pterygia before venturing to open the cornea for iridectomy or cataract extraction, on account of the great danger of infection, so the operation has more than a cosmetic importance aside from its obscuration of the cornea. In dealing with pterygia, as in all other disorders of the eye, good common sense and mechanical skill will be found to be the prime factors of success. A careful individualization of each case can alone secure all the advantages of these many good, though none perfect, operations. The best results will frequently follow a combination of several, or the modification of the merits of any one to adopt it to the needs of the hour. The highest genius in these matters may be as purely selective as inventive. The aim of this paper has not been so much to be exhaustive as suggestive, not so much to teach as to draw out the opinions and better experiences of my collaborators in our endless task. If these poor suggestions stimulate that wealth of comment and enlargement of clinical experience that has frequently followed similar disquisitions in the past, we shall not have written in vain.

ABSTRACTS FROM CURRENT LITERATURE.

Berens, T. Passmore.—Cork Splints for Deflections of the Nasal Septum.—*Manhattan Eye and Ear Hospital Reports*, 1894.

In order to overcome the evils so frequently resulting from the use of ivory plugs, metal tubes, oakum, cotton, etc., after operations upon the septum, the author has devised a splint, made from cork, in the following manner : " A selected cork (pint bottle size) in average length $1\frac{1}{4}$ inch, in breadth at its broad end three-quarters of an inch, at its narrow end one-eighth to one-quarter of an inch less, in thickness from one-quarter to three-eighths of an inch, is whittled to the shape of an almond with the point cut off, and flattened on the side that is to lie against the septum ; the opposite side near its lower border is slightly grooved for the reception of the inferior turbinate body. A nasal burr or trephine is now used to hollow the splint, leaving the shell one-sixteenth to one-eighth of an inch thick. A rat-tail file, small-bladed knife, or red-hot metal may also be used for this purpose. Sandpaper is used to smooth both the inner and outer surfaces, and the whole splint is then coated with flexible collodion, to which has been added iodoform in the proportion of thirty grains to the fluid ounce. Allowed to dry, it is ready for use."

After removing outgrowths, spurs, etc., and breaking up adhesions, the septum is completely fractured with Adams' forceps and molded between the little fingers, into the proper position, and the splints introduced, on either side. The nares may be cleansed without removing the splints. It is claimed for these splints that they are firm enough to support the septum ; they do not absorb secretions and are practically aseptic ; they do not interfere with the circulation and do not produce ulceration from pressure ; they are easily cleaned without removal ; they are cheap and easy to prepare.

The writer gives a number of clinical cases, the first of which was operated in October, 1891, with very successful results, and when seen three years later, there was no return of the deformity.

PEARSALL.

Bach, Dr. Ludwig.—Tuberculous Infection of the Eye.—*Archives of Ophthalmology*, Vol. xxiv., No. 1.

Bach takes exception to the statement made by most authors to the effect that tuberculous affections of the eye are of rare occurrence, and supports Michel in his assertion that its existence is not infrequent.

He lays stress upon the following four points :

First. Tuberculosis of the eye is by no means a rare affection.

Second. All parts of the eye may be attacked by the disease.

Third. It plays a particularly important role in diseases of the uveal tract.

Fourth. The eye disease may be the earliest and only manifestation of the tuberculous infection.

In the *lids* it may manifest itself as lupus, tuberculous affection of the meibomian glands under the form of chalazion filled with tuberculous granulation tissue, or a diffuse tuberculous infiltration of the tissues.

Of the latter form he cites a case in which the patient, a child of seven, presented almost complete ptosis of the right eye ; there was swelling of the lid which was soft and spongy to the touch. The palpebral conjunctiva was spongy, resembling granulation tissue, from which exuded a moderate mucous discharge. The skin was intact. The diagnosis was substantiated by the transplantation of a piece into the anterior chamber of a rabbit, which was followed in four weeks by well-marked tuberculosis, large numbers of tubercle bacilli being found on microscopic examination.

In the *conjunctiva* it may take the form of an ulcer with raised, irregular borders and lardaceous base, or we may find the yellowish-red miliary nodules which may disappear or break down, forming an ulcer. This second form is most frequently located upon the conjunctiva covering the tarsus. The third form shows itself as a tuberculous degeneration affecting the follicles of the conjunctiva, its chief seat being the retrotarsal folds, but it occasionally extends to the bulbar conjunctiva closely resembling, both anatomically and clinically, trachoma.

In the *cornea* it appears under the form of a parenchymatous keratitis, but more particularly the form known as sclerosing keratitis which may result from a tuberculous eruption occurring at the corneo-scleral junction, particularly involving the fibers of the ligamentum pectinatum.

In the *iris* we most frequently find the nodules situated at the periphery, although their presence may be overlooked owing to their being situated deeply in the stroma of the iris, or to the fact that their presence is of short duration. As a rule, the affection runs a chronic course with occasional exacerbations. Synechia is infrequent, but a marked feature is the aggregation of deposits on Descemet's membrane. The disease may present itself as a granuloma of the iris.

From the observations of the author of the article he considers that iritis is as frequently due to tuberculosis as to syphilis.

In the *ciliary body* it assumes the form of a chronic inflammation with opacities and connective tissue formation in the vitreous with occasional numerous hemorrhages into the latter. The sclera may be involved secondarily.

In the *choroid* it occurs either as an acute miliary or chronic tuberculosis. The nodules push forward into the retina and become surrounded by pigment. The centers of these diseased areas frequently show patches of pigment, while hemorrhages are frequently observed in the immediate vicinity. Later in the course of the disease there is absorption of the pigment-epithelial layer over a large area, while in other portions it may be piled up in isolated patches. The choroid assumes a dirty yellowish-white color. In the limits of the diseased areas or along their boundaries are frequently seen round, sharply cut, yellowish-white spots.

Michel has found granuloma of the choroid in connection with the appearance of detachment of the choroid or retina, or an abscess under the bulbar conjunctiva, or a cheesy abscess in the vitreous.

In the *retina* the nodules are situated mostly in the deeper layers, these being secondary to the affection of the choroid or optic nerve.

In the *papilla* it may show itself as a yellowish-red swelling projecting into the vitreous, from which there may hang clusters of nodules attached to whitish threads. It may also assume the form of a chronic neuritis or of a chronic degenerative atrophy.

We may have paralysis of the extrinsic *muscles of the eyeball* due to a tubercular basilar meningitis, or an *ostitis* of the bones at the base of the brain.

In the *bones of the orbit* it assumes the form of a tubercular *ostitis* or *periostitis*, which, extending to the optic foramen, may give rise to atrophy of the optic nerve from compression. When it involves the orbital margin cicatricial *ectropion* may result.

Michel attributes many cases of orbital cellulitis occurring in children to tuberculous infection.

The *lachrymal sac* or its bony walls may be the seat of tuberculous ulceration, giving rise to *blennorrhea*.

In conclusion the author states that he considers children up to the age of puberty more liable to suffer from tuberculous affections of the eye, although adults are not exempt.

RITCHIE.

Heflebower.—Clonic Spasm of the Tensor Tympani.—*N. Y. Medical Journal*, March 16, 1895.

The patient is a woman, *æt.* thirty-six, in good health.

Right ear, perforation with chronic *otorrhœa* of years' standing. Left ear, membrane a little lax; reflex absent; hears watch sixteen inches.

Patient complains of a clicking noise in ears accompanied by a twitching of the muscles of the throat, aggravated by marked exertion, sudden fright, and at the time of the menses. The annoyance is slight when she is quiet. The clicking is simultaneous in each ear, comes at irregular intervals and is never rhythmical.

The noise can be faintly heard, but no motion of the membrane of the right ear is apparent because of the perforation. In the left ear a very perceptible indrawing of the central and lower part of the membrane can be seen at the time of each click, the muscles of the soft palate contracting synchronously with the tensor tympani. Larynx not affected. The father of the patient died insane.

The author mentions another case from his own experience, in which the sound was at times perceptible at a distance of two feet, and in which the throat complication included the larynx. This occurred in a man of mature age, whose mental condition bordered on insanity.

DEADY.

Francisco.—Report of Forty Cases of Ophthalmia Neonatorum.—*New York Eye and Ear Infirmary Reports*, January, 1895.

A bacteriological examination was made in all the cases. Thirty were gonorrheal, in which category were included all the cases where the discharge appeared on or before the fourth day ; those in which it appeared from the fifth to the eighth day were not gonorrheal. All of the severe cases were gonorrheal, but many of the gonorrheal cases were so mild that they were only distinguished by the presence of the gonococcus.

Staphyloma or bad leucoma occurred only in the cases which had been neglected before entering the infirmary. In the thirty gonorrheal cases with sixty eyes involved, $6\frac{2}{3}$ per cent. became staphylomatous, 5 per cent. had vision badly impaired, and 10 per cent. had slight impairment of vision. In no case that was not gonorrheal was the cornea attacked.

The average duration of the gonorrheal cases was fifty-three days ; of the others, thirty-six days. The treatment was ice pads, boric acid solution, and the daily application of sol. argent. nit. 1 per cent. to 4 per cent.

DEADY.

Morison, Rutherford.—Subconjunctival Hemorrhage Limited to the Outer Part of the Eye, a Sign of Fracture through the Corresponding Orbital Plates.—*London Lancet*, January, 1894.

The paper is intended to show that a fanlike subconjunctival hemorrhage on the outer portion of the eye is an absolutely diagnostic symptom of transverse fracture of the corresponding orbital plates of the frontal bone. The author suggests as reason for this particular disposition of the blood, the lessened resistance of the loose cellular tissue in this locality, the form being determined by the pressure of the lids. Three cases are detailed, in which diagnoses based upon this symptom were verified by the autopsies.

DEADY.

Snell, Simeon.—Congenital Serous Cysts of the Eyelids, Associated with Anophthalmos or Microphthalmos.—*Trans. Ophthal. Soc.*, vol. xiv.

The author reports three cases of congenital serous cysts of the

eyelid, accompanied by anophthalmos or microphthalmos. The cyst was unilateral in each case, upon the lower lid in two and the upper lid in the third. Two of these patients were females, the other a male. Incorporated in the article is a table from Van Duyse, showing the chemical characteristics and other properties of the contents of these cysts, of the aqueous humor, of the cerebro-spinal fluid, and of dermoid and hydatid cysts.

DEADY.

Westhoff.—Paralysis of the External Rectus and Pneumonia.—*Centralbl. f. p. Augenh.*, January, 1894.

A paralysis of the external rectus of the right eye was found in an infant, two and a half years old, who had been sick for three days with pneumonia of the left apex. The paralysis diminished as the pulmonary symptoms became ameliorated, and disappeared as health became restored. The author considers this paralysis comparable to that accompanying diphtheria.

DEADY.

Claiborne, Dr. J. Herbert.—A Case of Hysterical Amaurosis in both Eyes, with Recovery in a few Days.—*N. Y. Academy of Medicine, Am. Medico-Surgical Bulletin*, No. 8, 1895.

A young lady of an emotional temperament, but otherwise of sound health, became suddenly blind while playing the piano. A month previous to the attack she had passed through a period of great mental excitement, and subsequent to it had displayed this exalted emotional condition.

She was seen by Claiborne the day following the attack, at which time she presented the characteristic facial expression of hysteria. On being commanded to open her eyes she did so with an apparent effort. There was slight divergence of the eyes with an upward tendency. The pupils responded to light stimulus, but their reaction during the act of accommodation could not be satisfactorily studied owing to her inability to fixate, as there was perception of light only. The fundi were normal except slight congestions of the optic discs.

She was given one pill consisting of valerinate of iron, quinine and zinc, and a strong "suggestion" was given to her that she would see again, but no mention was made of the time at which she would recover her vision. Two days later, as she was about to

start for his office, her sight returned. Her acuteness of vision for each eye was 20/20, and she read Jaeger No. 1 at the near point. She recovered without any scotoma.

RITCHIE.

Wilson, Alexander.—**Operations on Postnasal Adenoids from the Anæsthetist's Standpoint.**—*Med. Chron.*, February, 1895.

Assuming that postnasal adenoids can only be thoroughly and satisfactorily removed with the patient under the influence of a general anæsthetic, and in view of avoiding the danger of the passing of blood into the larynx of an unconscious subject, causing obstruction to breathing, which might occur if the hemorrhage were very severe as it sometimes is, the author discusses somewhat at length the choice of the anæsthetic and the position in which the patient should be placed.

Subjects of postnasal growths are usually young, pale, and anæmic, and consequently particularly susceptible to shock, while at the same time they are free from degenerative changes which sometimes make anæsthetics dangerous for adults. To obviate the tendency to faintness the child should have some fluid food not less than three hours before the operation, for vomiting is less dangerous than faintness.

The principle difficulty encountered in administering anæsthetics to this class of patients lies in the obstruction to the normal (nasal) respiration, which tends to prevent the entrance of the anæsthetic vapor into the lungs and thus delays its effect. While the patient is conscious, respiration takes place voluntarily through the mouth, but as unconsciousness approaches, there is a tendency for the jaw to fall back, the lips to be sucked in with each inspiration and the tongue to fall against the palate, thus forcing the air to pass through the nasal channel, which is blocked by the growth. The result is the patient becomes cyanotic from faulty aëration, and, at the same time, inhales but little of the anæsthetic and is long in passing under its influence. This may be overcome by keeping the jaw well forward and the mouth open.

Nitrous oxide, while it produces the quickest effect, is uniritating, pleasant to take, safe, and rapid to recover from; is objectionable on account of its short and always uncertain dura-

tion, the danger of reapplying the inhaler with the pharynx full of blood, and the risk of drawing blood and pieces of the adenoid into the larynx during the deep, gasping respirations of returning consciousness.

The danger of blood being drawn into the larynx is infinitely less, if the patient is thoroughly under the influence of the anæsthetic, than when there is semi-consciousness with fright, spasmodic respiration, coughing, etc. "The only anxious cases are those in which this rule has been disregarded, and the patient has been allowed to 'come out' of the anæsthetic."

With ether, there is no cardiac depression, the frequency and depth of the respirations are increased, a deeper anæsthesia may be produced, with safety, than when chloroform is used, and the effect often lasts until the end of the operation. Its disadvantage is its irritating effect upon the pharynx.

Chloroform is easily given, is quick to produce its effect, and can be continued without interfering with the operation. The danger in its use arises from an overdose during an unusually deep inhalation while crying, or if the respirations have been stopped by the operation; or, from its action in depressing the heart.

In adults or older children, the author prefers to begin with nitrous oxide and ether, continuing the anæsthesia with chloroform (unless contra-indicated). In infants, he begins with chloroform, and, if taken well, continues it through the operation, if taken badly, ether is substituted.

In regard to the position of the patient, the author prefers to have him lie "upon his back, the head completely extended, and preferably hanging over the end of the table." Its advantages are: it is the safest for the administration of any anæsthetic, respiration is easily performed, it affords a good view of the parts to be operated upon, it is the easiest position for the operator, and in case of hemorrhage the blood cannot enter the larynx since its orifice is above that of the nares and teeth. It is true that there is more hemorrhage on account of the congestion caused by this position, but this is more than counterbalanced by the facilities offered for arresting an unusual hemorrhage.

PEARSALL.

Bacon.—Spontaneous Rupture of the Mastoid Cells.—*N. Y. Medical Journal*, May 18, 1895.

At a meeting of the Society of Alumni of Bellevue Hospital, Dr. Gorman Bacon presented a girl, two years old, who suffered from otitis media suppurativa for fifteen months, after which a swelling appeared over the mastoid process, which later ruptured spontaneously. A large sinus had become established directly over the antrum, with a foul-smelling purulent discharge from the ear. A long incision had been made down to the bone, and a sequestrum, an inch by three quarters of an inch, had been removed. Under antiseptic treatment, and the administration of the iodide of iron, healing had been prompt.

DEADY.

Hunter.—A Case of Vaccinia Palpebrarum.—*New York Eye and Ear Infirmary Reports*, January, 1895.

The patient, a boy *æt.* three years, had been scratched on the eyelid by another child, who had been vaccinated, and who had been scratching his arm. The entire lower lid on its cutaneous surface, was converted into a confluent postule. Another extended along the margin of the upper lid for its entire length. The lids were red and swollen and the maceration of the pustules by the tears gave to the case at a little distance the appearance of a purulent ophthalmia. The inner surface of each lid was covered by a thin, pultaceous, dirty gray exudation.

The pre-auricular, parotid, and submaxillary glands were much swollen and there was intense suffering. The resulting cicatrices were extensive but shallow, and there was no ectropium or entropium.

Most of the cilia were destroyed and there were a few faint and superficial corneal opacities.

DEADY.

Chiari (Vienna).—On the Operation for Adenoid Vegetations.—*Journ. of Laryn.*, October, 1894.

The author gives a *résumé* of 233 operations for adenoid vegetations occurring in his private practice, and 152 in his hospital practice. The latter represent 3.8 per cent. of a total of 4000 throat and nose cases treated. Of the private patients, 121 were males and 112 were females; while of the hospital patients, 58 were males and 94 were females. This discrepancy

is probably due to the fact that the girls being at home are under closer observation than the boys. In 379 cases, 130 were under ten years, 196 between ten and twenty, 37 over twenty, and 16 over thirty. Fourteen of the cases over thirty had very small growths.

In the majority of the cases the cold snare was used through the anterior nares, which were swabbed with a 20 per cent. solution of cocaine. The snare was passed in vertically until it reached the posterior wall or the obstruction, and was turned through a quarter of a circle to a horizontal position. It was then withdrawn a little until the snare was felt to touch the septum, when the point was raised to surround the growth and the wire tightened. This process was repeated on each side until the entire growth was removed. Of the 163 cases operated by the snare, 66 were successful in one sitting, 56 in two sittings, 33 in three sittings, 7 in four or five sittings, and 1 in nine sittings.

In regard to the objection that the growth is removed in small pieces, it makes no difference whether the pieces are large or small, provided the entire growth is removed. The objection that the vegetation situated high in the naso-pharynx cannot be reached, and that the growth is not grasped at the base but lower down, is not borne out by the author's experience, since he was able to remove, without difficulty, flat hypertrophies of the vault, lying above the upper edge of the choanæ.

The advantages of this method are : its absolute freedom from danger, since nothing can be seized except the vegetation ; there is but little bleeding, and almost no pain ; and, ordinarily, there is but little need of assistance.

"On these grounds I have kept to the use of the cold snare through the nose, and I am so far satisfied that I never use for the removal of soft benign growths of the naso-pharynx, instruments which frequently wound and tear the naso-pharyngeal mucous membrane considerably."

PEARSALL.

Friedenberg, Dr. Percy.—A Case of Exophthalmic Goiter with Monocular Symptoms and Unilateral Thyroid Hypertrophy.—*N. Y. Academy of Medicine, Am. Medico-Surgical Bulletin*, No. 8, 1895.

A case of the above, occurring in a female of twenty-four years, is reported by Friedenberg.

The patient was of a nervous temperament, which was constantly excited by domestic disturbances. A few weeks before presenting herself for treatment she noticed that she became easily fatigued and that her vision became blurred after using her eyes for a few minutes for reading or sewing ; while the left eye had a perceptible staring expression.

On examination there was found to be a slight proptosis of the left eye ; slight involuntary movements of the lids ; flushing of the face, more marked on the right side ; enlargement of the isthmus and right lobe of the thyroid gland ; intermittent and tumultuous action of the heart ; pulse 120.

Treatment consisting of ice-bags applied to the head and neck together with small doses of digitalis was tried, but the use of the drug was discontinued, as it seemed to intensify the cardiac symptoms, and in its place strophanthus in three-drop doses three times daily was substituted, supplemented by sodium bromide at night. This has been continued for the past ten weeks with slight but perceptible improvement.

RITCHIE.

Lecstikow.—Treatment of Leukoplakia.—*Monats. f. p. Dermat.*, xix, 1894.

The author advises the use of the following prescription, applied on a piece of wood several times a day, particularly after meals and before retiring. After from one to two weeks the tongue will become very painful and the use of the paste should be stopped. The mouth should then be washed with borax-peppermint water, and balsam of Peru should be applied to the diseased surface. A number of cases are reported in which a rapid cure was obtained by this method of treatment.

R	Terræ siliciæ.....	1½ dram
	Resorcini ..	2 drams
	Adipis.....	½ dram

PEARSALL.

Gibb.—Zinc Stearate in the Treatment of Atrophic Rhinitis.—*Phil. Med. News*, lxx, 1894.

After noting the intractability of the disease to treatment, and urging the necessity of patience, which is sure to be rewarded by at least a modicum of success, the author reviews somewhat fully the general appearance of the diseased membrane and the existing

pathological condition. As a requisite for success, absolute cleanliness and the complete removal of all crusts and secretion is insisted upon, since without this precaution it is impossible to apply the medicament to the diseased surface. (A still stronger reason for the removal of all inspissated secretion is that these hardened crusts act as would a foreign body, in increasing the existing inflammatory action. Abs.)

The method followed at the Episcopal Hospital in Philadelphia, is to spray the nasal cavity thoroughly with some antiseptic, detergent spray, and, as a spray is not effective in the post-nares and vault of the pharynx, where secretions are most apt to be retained, it is advisable to use a post-nasal syringe. The crusts are then carefully removed with a piece of cotton rolled on the end of a cotton-holder, and the antiseptic spray used again. The membrane being now clean, zinc stearate containing twenty-five per cent of euophen is insufflated in such a manner that the lower and middle turbinateds are covered with a thin layer of the powder. During the intervals of treatment the patient is advised to use a solution of Seiler's tablets in a hand atomizer.

The especial advantage of this preparation is that it adheres closely to the mucous membrane and therefore its medicinal action is prolonged. The patients were seen twice a week, and in nearly all cases the odor disappeared after the first treatment and there was no subsequent return of the crusts. Failures were due probably to neglect in carrying out directions and treatment.

PEARSALL.

Darier, A.—Vascularity of the Anterior Crystalline in a Case of Chronic Iridochoroiditis.—*Ann. d'oculist.* January, 1895.

Using the ophthalmoscope with a twenty or thirty diopter glass, there is seen, at the inferior internal portion of the pupil, a network of finely ramifying blood vessels, formed by the abnormal prolongation of the veins and arteries found upon the surface of the iris, extending to the anterior crystalloid. This does not seem to be a persistent pupillary membrane, but rather a vascular network, that had its origin in an old pupillary exudation, in a patient who has, for many years, had frequent attacks of iritis, which have left numerous deposits upon the uvea with posterior synechia.

DEADY.

Spicer, Holmes.—Case of Retinitis Circinata.—*Trans. Ophth. Soc.*, vol. xiv.

The author publishes a very complete history of a case of retinitis circinata, that occurred in a woman seventy-three years of age. The left eye was the one affected and presented the usual appearance of that condition, that is, a grayish stain in the macular region, spotted with darker points, probably the result of old hemorrhages, forming an incomplete ellipse, and giving the appearance of white spots encircling the central white stain. In the right eye there were several hemorrhages of the retina, but no sign of "retinitis circinata."

To a certain extent, this tends to confirm the opinion of Wecker, that this form of retinitis is only a species of retinitis hemorrhagica.

DEADY.

Schwarz.—A Case of Incomplete Reflex Reaction to Light in the Right and Incomplete Accommodation in the Left Pupil.—*Centralblatt f. p. Augenheil*, December, 1894.

The patient, a young man of twenty-five years, presents the following irregularity of pupillary action: In bright daylight the right pupil is fully dilated and reacts but feebly to light, while the accommodation and convergence is very good. On the other hand, the left pupil is dilated in the dark; it reacts very well to light, while the accommodation and convergence are poor. This condition is probably congenital. It has been known to the family physician for a long time, and there is no history of syphilis, nor of cerebral trouble. The author is inclined to accept the theory of Heddæus, and would attribute the inequality in this case to intrinsic feebleness of the sphincter, on the right side, and of accommodation, on the left.

DEADY.

Sanger.—A Mechanical Device for Ozena.—*Therapeut. Monats.*, No. 10, 1894.

The author has devised a little apparatus composed of two small plates, which he places just within the nasal orifice, diminishing its calibre. Believing that diminished intensity of the air entering the nasal cavity during inspiration and expiration exerts an evil influence upon the circulation of these parts, and in this way favors the development of ozena, he increases the air pressure by diminishing the nasal opening, thus producing a more

normal condition in the nasal cavity. He reports cures in mild cases and improvement in more serious ones.

PEARSALL.

Delavan, D. Bryson.—**The Effects of Deafness in Others upon the Child's Voice.**—*Journ. of Laryn.*, March, 1895.

The author speaks very strongly against the practice of allowing children to converse habitually with persons who are deaf, on account of the strain upon the larynx during forced phonation, the child being more likely to subject the voice to greater strain than the adult. He therefore advises the invariable use of the speaking tube, at least while holding conversations with children, and, if there is any indication of trouble in the larynx, the child should either be removed or forbidden conversation with the deaf person.

PEARSALL.

Semon.—**The Sensory Throat Neuroses of the Climacteric Period.**—*Brit. Med. Journ.*, January 3, 1895.

The author speaks of the intimate relation existing between the sexual organs and the respiratory apparatus, and remarks the absence of this subject in text books treating of gynecology or laryngology. The absence of objective symptoms (as a rule) is noted and he classifies the subjective symptoms, which are extremely varied, under two general heads. First, paræsthetic sensations, such as burning, choking, strangulation, etc. Second, neuralgic sensations, usually occurring as a sharp fixed pain in one side of the throat. In making a diagnosis, local conditions must be eliminated, while, at the same time, trifling lesions should not be considered sufficient cause for the neuroses.

PEARSALL.

Fullerton, Robert.—**An Unusual Condition of the Pillars of the Fauces, Probably Congenital.**—*Brit. Med. Journ.*, May 4, 1895.

The patient, a married woman of twenty-nine years, having a good family history, had scarlet fever when a child and "brain fever," caused by a blow, when she was twelve years old. There is no evidence of syphilis.

Both tonsils are wanting. On the left side the posterior pillar

is lacking, while anteriorly, a single band passes downward from the soft palate, in the usual position of the anterior pillar. Near its lower attachment it becomes expanded and is directed slightly backward. Between its inner margin and the buccal walls is an elongated opening, extending from the level of the uvula almost to the lower border of the band. The right side is similar to the left, except that the band is broader, the opening larger, and a thin membranous ribbon occupies the normal position of the posterior pillar. There is no evidence of scar tissue about these bands or openings.

A superficial destruction of mucous membrane begins at a point just above the esophageal opening and extends upward, partly over the epiglottis; over the site of the tonsils, the posterior pharynx and naso-pharynx. There is no contraction, and the appearance indicates a superficial destruction of the mucous membrane, leaving the fibrous layer exposed. The writer believes the condition to be congenital.

PEARSALL.

Hubbard.—Absence of the Epiglottis.—*N. Y. Medical Journal*, April 6, 1895.

The author reports a case, of a woman, aged thirty-five, whose epiglottis had been almost entirely destroyed, only a small stump remaining, about a centimeter in breadth and half a centimeter in length.

Physical examination showed dullness over the right apex, with tubular respiration, and tenderness to percussion over both apices. There was a history of pulmonary trouble, which had declined as the throat became implicated, the latter affection in turn clearing up, leaving a sensation of lateral tension or slight constriction of the throat. For two years she has been free from cough but has been unable to take pungent or highly spiced food or cold drinks without experiencing a burning sensation for hours. There has been no other trouble with deglutition. Six months' observation shows no material change. There are at present no signs of active tubercular disease.

The condition of the epiglottis is ascribed to tuberculosis or lupus.

PEARSALL.

BOOK REVIEWS.

DISEASES OF THE NOSE AND THROAT. By F. DEHAVILAND HALL, M. D., F. R. C. P. London. Physician to out-patients, and in charge of the throat department at the Westminster Hospital; joint lecturer on the Principles and Practice of Medicine at the Westminster Hospital Medical School. pp. 524. London: H. K. Lewis, 136 Gower Street, W. C. 1894.

This book gives a very complete, though concise account of all the diseases of the nose and throat. Each subject is treated in a very thorough manner, and, while extensive theoretical discussion is eliminated, profuse reference to current bibliography renders the further investigation of various points a matter of considerable ease. While the indications for, and methods of operative procedure are discussed, the minute details of operations are omitted. Taken altogether, the book ably realizes its design in giving a complete account of all the diseases of the nose and throat within a volume of moderate limits.

DISEASES OF THE NOSE. By JAMES B. BALL, M. D., (Lond.), M. R. C. P. Physician to the Department for Diseases of the Throat and Nose at, and Physician to the West London Hospital. Pp. 364. Second Edition. London: Balliere, Tindall & Co., 20-21 King William Street, Strand. 1894.

The first edition of this work was confined exclusively to the nose and naso-pharynx. These subjects being treated in such a manner as would be most useful to the general practitioner and senior student. The field of the present edition is somewhat enlarged, in that diseases of the pharynx are also taken up. The various articles are very clearly and concisely presented, with such changes and additions as are necessitated by the advance in medical knowledge. Mooted questions are omitted, as well as some rare diseases not met with in England. The author has, in this way, collected in comparatively small space, the actual, practical state of our knowledge upon this subject.

POST-NASAL GROWTHS. By CHARLES A. PARKER. Assistant Surgeon to the Hospital for Diseases of the Throat, Golden Square, London. London: H. K. Lewis, 136 Gower Street, W. C. 1894.

While not intended as an exhaustive treatise, this little book presents, in a very clear and concise way, and much more at length than in most text-books, the state of our knowledge regarding adenoid growths in the naso-pharynx. The first chapter reviews the history of post-nasal growths, and gives their ætiology, pathology, and symptomatology. The second chapter contains some very interesting experiments made by the author, relating to the breathing of patients afflicted with these growths, showing that, while mouth breathing may be indulged in during the walking hours, the tendency during sleep is toward nasal respiration. The following chapters treat somewhat fully and very systematically of the complications, diagnosis, treatment, indications for removal, etc. A perusal of this clever little volume would well repay any physician.

THE DISEASES OF CHILDREN AND THEIR HOMEOPATHIC TREATMENT. A Text-Book for Students, Colleges and Practitioners. By ROBERT N. TOOKER, M. D., Professor of Diseases of Children in the Chicago Homeopathic Medical College, etc. Chicago: Gross & Delbridge. 1895.

This is a handsome volume of 813 pages, well printed on good paper, with clear type, and altogether a credit to the publisher in its general makeup. In the preface the author states that he has had the work in hand for several years, but has delayed its completion, hoping that similar work would be taken up by more competent hands, a modesty which is rendered quite unnecessary by the results of his labor. The various diseases to which "the father of the man" is subject are concisely but clearly treated, the salient points of each being forcibly presented and the methods of differentiation well described. Considerable space is given to hygienic and local measures, and in all the important diseases the list of drugs and the symptoms pointing to their selection are very full.

The author has been assisted in his work by able coadjutors in certain departments and these have added much to the value of the book. Diseases of the heart have been written up by Professor E. M. Hale, and in this chapter will be found indications for

some of the newer remedies which have been found useful in these affections.

Professor Clifford Mitchell is to be congratulated for his scientific presentation of the diseases of the urinary tract. This section contains much valuable information in a small space.

The diseases of the eye and ear have been treated by Professor J. H. Buffum as thoroughly as the space would allow, and those acquainted with the author will need no recommendation for his work.

This text-book is a welcome addition to the literature of our school and it should be in the library of every homeopathic physician.

A REGIONAL AND COMPARATIVE MATERIA MEDICA. Embracing new Principles and Methods of Arrangement, and giving in one Volume full and immediate control of the entire Homeopathic Materia Medica, without abridging the usual form of the Symptomatology. By JOHN GILMORE MALCOLM, M. D., and OSCAR BURNHAM MOSS, M. D., Published by the authors, Chicago. 1895.

This work is an entirely new arrangement of the homeopathic materia medica, and one that should be very useful to the busy practitioner. The book is divided into forty-two chapters, each chapter being devoted to one of the regional or anatomical divisions of the body as they are commonly arranged in our text-books on this subject, beginning with "mind," "sensorium," etc., and including "pains and sensations," "tissues," "aggravations," and "ameliorations."

The arrangement differs from that found in most other works on the subject in the fact that while in the latter all of the rubrics are to be found under each drug, in the present instance we find all the drugs having any bearing on the subject grouped under each rubric; thus under "mind" all the remedies affecting the mental functions are arranged in alphabetical order, and the symptoms of each are given, their relative importance being indicated by appropriate signs, enabling the physician to find a given symptom by referring to a single chapter, and this is further simplified by a complete repertory at the end of each division.

Some 260 drugs are considered in the work, which is a handsome volume of 920 pages, with a copious index, and which cannot fail to be of great value to the profession.

THE JOURNAL OF OPHTHALMOLOGY, OTOLOGY AND LARYNGOLOGY.

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MUSCULAR INSUFFICIENCIES.*

BY GEORGE ALSON SUFFA, M. D., BOSTON.

THERE is probably no subject in ophthalmology which is receiving so much attention at the present time, upon which there is so much difference of opinion, and for which the methods of treatment vary so much.

From the two extremes, those who advocate graduated tenotomies in nearly all cases, to those who ignore the condition entirely, there are many positions to occupy. In the text-books the condition is only imperfectly considered, and viewing the matter as a whole, one is left in doubt just what course to pursue.

To indicate a conservative and scientific system of procedure and to introduce an original method for testing errors and prescribing prisms and a modified method of operating, is the purpose for which this paper was undertaken.

A muscular insufficiency—better named a muscular error, because often not an insufficiency but an over-sufficiency of a muscle or set of muscles—may be defined as that condition of the eyes where there is a tendency of one or both visual lines to deviate from the point of fixation.

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The nomenclature of Dr. Stevens will be used in this paper.

Orthophoria : A tending of the visual lines in parallelism.

Heterophoria : A tending of these lines in some other way.

Esophoria : A tending of the visual lines inward.

Exophoria : A tending of the visual lines outward.

Hyperphoria : A tending of the right or left visual line in a direction above its fellow.

Hyperesophoria : A tending of the right or left visual line upward and inward.

Hyperexophoria : A tending of the right or left visual line upward and outward.

It is not at all uncommon to have several of these varieties combined in one case, as either at the distant, or near point, and these combinations may be entirely different as to the two points. For example, we may have an exophoria of low degree at the distant, increased at the near point; or high degree at the distant, with lower degree or orthophoria, or, more rarely, an esophoria at the reading point, combined with a hyperphoria of different degree at the two points; or a hyperphoria of one eye at infinity, and of the other in accommodation. This applies to all the varieties, making possible many combinations which it is important to detect in our examinations and to consider in treatment, but unnecessary to enumerate here. There may also be a tendency for one eye to rotate on its antero-posterior axis, which may also show differently at the distant and near point.

I think it would be advantageous to have a classification according to the causes, and whether congenital or acquired.

Congenital are divided into muscular and nervous.

Muscular.—Due to faulty development, attachment, or weakness of muscular tone or to irregular or imperfect development of one or both orbits.

Nervous.—Faulty arrangement or development of nerve matter; perhaps faulty impulse. In this class some of the spasmodic cases may belong.

I. Muscular.

Acquired. 2. Nervous.

3. Refractive.
4. Mixed.
5. Spasmodic.
6. General—due to some disturbance in general health.

1. *Muscular*.—Where refraction is normal this form can only be diagnosed with certainty in the young, by excluding all outside influences, and I think is a comparatively rare condition.

2. *Nervous*.—These are secondary to other conditions. A theory or reason for this conclusion will be given later.

3. *Refractive*.—Muscular errors, I consider, comprise the greater number of cases. Knowing the intimate relation of action existing between accommodation and convergence, we can readily realize how an uncorrected error of refraction becomes a productive source of muscular unbalance.

I am also a believer that during the growing period, when there is inharmonious action of these two functions, that that part of the brain having control over these functions, by undue demand, becomes abnormally developed, so that a call from that center is returned to the point of action in abnormal amount, after the once existing condition or relation has become altered by a change in refraction or muscular error, and we have a secondary nervous form of muscular error.

4. *Mixed*.—A form due to a united force of two or more of the above forms.

5. *Spasmodic*.—Rarely independent, usually dependent on some error of refraction.

6. *General*.—Due to any cause affecting the general health, or tiring of the eyes.

First.—We will draw our deductions from a case of manifest hyperopia of two dioptries, with esophoria, requiring a nerve impulse for two dioptries of accommodation at infinity and a relative amount of convergence, which, of course, cannot take place. Now in the usual course of events, all things being equal, an increase of the natural impulse to

the interni will have a stimulating and developing effect, producing over-development, not insufficient externi, and we have the condition, *esophoria*, of moderate or high degree, often becoming convergent strabismus. This form may be present at all times of life and in all degrees of hyperopia, but more often during childhood, and of the highest degree at this time, as there is a tendency to internal insufficiency as age advances.

Second.—We will consider a case of equal degree having exophoria. Here it is more difficult to understand how the condition is brought about unless we take into consideration the many conditions having a debilitating influence that may be brought to bear on an individual having hyperopia. This form of exophoria I believe is quite rare as a primary condition, but as a secondary state I believe it to be quite common, especially in middle life.

Thus we see that the same degree of hyperopia is capable of producing either exophoria or esophoria, the form of error depending not so much upon local as upon the general condition of the individual. The general health being normal, an esophoria will be developed as a primary state, which at any time may become a secondary exophoria by anything that has a debilitating effect on the general health, most prominent among which are acute and chronic disease, excessive physical or mental work, too long use of the eyes at near work, especially if under poor nourishment and unsanitary surroundings. That a muscular error is often a very complex matter, many elements having entered into its foundation, we have sufficient evidence. I wish to emphasize that an esophoria with hyperopia is not an insufficiency of the externi, but an over-development of the interni.

Before describing a method of examination and a system of application of prisms and a method of operation which is original, I desire to say a word about the various appliances in use for measuring the degree of muscular error, all depending on diplopia or double images, a condition not only disagreeable, but one that all eyes strive to over-

come ; consequently, these tests are uncertain and inaccurate, showing marked variance at one or at different sittings. It is for this reason that for the past three years I have been working on a different principle, that of getting a measurement of the error while the eyes are in a state of rest, or while one is excluded from vision. This is as important in low degrees of muscular error as it is to test small errors of refraction while the ciliary muscle is in a state of rest. This method I have found far superior in accuracy to any of the various tests now in use.

System of examination.—First, accurately correct all errors of refraction, however small. If ciliary spasm exists, it must be removed before we can conclude as to the muscular condition.

All that is necessary for the test, other than is contained in an oculist's outfit, is a card two feet square with a circular black spot two inches in diameter printed in the center for the distant point, infinity ; a card six inches square with spot one-fourth inch in diameter and a line drawn through its center, extending an inch and a half beyond each side of spot, for the near point ; and a plain card two by four inches square, for excluding one eye from vision. A prism pile is very convenient in addition to the prismatic lenses in a test case, but can be dispensed with.

The patient is placed at the ordinary distance, twenty feet ; the examiner, standing in front and slightly to right of patient, so as to leave an unobstructed view of large card, and with exclusion card in right hand, alternately covers each eye, requesting patient to observe behavior of spot. At the same time the action of each eye is noted as it is uncovered by the examiner. If esophoria be present, the patient will see an apparent movement of the spot against the movement of the card in examiner's hand, and the eye will move outward in line of vision. In low degree it may be somewhat difficult for the examiner to see this motion at first, as the adjustment in line of vision is very rapid ; but as the patient always sees the apparent movement of spot in this form of error, there is no danger of its being

overlooked. In exophoria the apparent movement of spot is with the movement of exclusion card, and the movement of eye is inward, much slower than in esophoria, and often interrupted. In low degrees the patient readily recognizes the apparent movement of spot, and we have his aid, in high degrees especially ; if there be hyperphoria of one eye in the relaxed position it is the exception for patients to recognize any apparent motion, although they will volunteer the statement that they feel the eye move. But, as stated, the adjustment is so slow that the patient's aid is not required.

It is also well to observe the position of each eye while excluded, and to keep it under constant observation while excluded and active. In order to do this it will be necessary to stand at the left of patient while examining left eye. If any confusion arises in regard to the apparent movement of spot in low degrees of error, a one degree prism held so as to cause increased motion will clear up the confusion. Sometimes holding the card for a longer time over the excluded eye will accomplish the same result, but the movement of the card should always be made quickly.

All forms of error can be measured accurately by this method.

If the oblique muscles enter into the combination, they must be worked out in the usual way, but not until all horizontal and vertical errors have been corrected. After having decided that there is a muscular error, a prism partly correcting the same is held over right eye, and each eye again alternately covered with card as before. The prism is increased in strength and the procedure repeated until all apparent movement of the spot and all movement of the eye ceases. The prism which brings about this state expresses the degree of manifest error.

In high degrees it is well to place a prism over each eye ; otherwise the prismatic rays become troublesome. Care should be taken to place the axes of prisms on a horizontal line, in order not to produce a vertical movement. If a vertical error be present after the horizontal error has been

corrected, prisms, axis vertical, should be placed, proceeding as above until all movement ceases.

Always correct all horizontal errors first unless the vertical error be the greater.

The same method is followed at the reading point, the patient holding the small card at the reading distance, and although the movement of spot is much less, being so much nearer the apex of angle formed by the line of deviation with the line of fixation, the apparent movement is readily recognized. The lenses suitable for the reading distance should always be worn in making this test.

Treatment can be divided into four divisions. Generally speaking, cases suitable for these several divisions may be separated into classes according to the degree and form of muscular error; but, as a muscular error is often a very complex matter as to cause, variety, peculiarity, and complications, many exceptions will arise, and all of the following divisions may become necessary in a single case in order to obtain the best results.

1. Cases for orthoptic exercise.
2. Cases for correction with prisms.
3. Cases for operation.
4. Cases for internal medication.

1. Cases suitable for exercise of the relatively weak muscle, are exophoria of not over three degrees in the distance with an increased amount in accommodation, or where the interni are relatively weak in accommodation alone. Also as an aid after partial correction of the distant exophoria by an operation or prismatic correction. In esophoria where latent hyperopia exists and we are striving to procure orthophoria by relaxing the ciliary muscle by slightly over-correcting the manifest hyperopia, or while using a mydriatic.

The class of cases which received the most benefit are the exophorias of low degree in the distance with increased amount in accommodation, with weak adduction, either as an original condition, or after being brought about by partial correction by prisms or tenotomy.

2. Cases suitable for correction, with prisms for constant wear, are : Esophoria as high as fifteen degrees distant and near, and of a higher degree if complicated with uncorrected or latent hyperopia, under conditions to be explained later.

Exophoria as high as ten degrees without hyperopia, and marked increase in accommodation.

Hyperphoria as high as six degrees.

3. Cases for tenotomy: Esophoria over fifteen degrees distant and near without latent hyperopia.

Exophoria over ten degrees distant and near, or of less degree if complicated with latent hyperopia.

Hyperphoria above six degrees.

The method of exercise which has given the best results is rhythmic in character and done in the following way : Patient is placed twenty feet from a lighted candle, is asked to look at same, and given a prism of two-thirds the power of adduction, which is to be held base out and over right eye while counting ten slowly ; he then removes prism and again counts ten, always fixing the flame. This is repeated over right eye. Then left is treated in like manner, making intervals of action and relaxation of six seconds. An increase of two degrees is added to the prism, and the counting repeated until the patient is unable to fuse flame by counting twenty. This constitutes one day's training. The following day a ten-degree prism is chosen as a beginner if twenty or more degrees were overcome the previous day, and the same method followed as at the first sitting. As soon as adduction equals thirty degrees after beginning with a ten-degree prism, five degrees are added until up to the previous day's training ; then two degrees are added until ability to fuse flame again is beyond twenty counts. This practice is repeated daily until the desired degree of adduction is acquired. The degree to be overcome is governed more by the effect of training on the existing error, than on the degree of error. The average is about forty degrees.

After the desired degree has been acquired, this practice is followed every day for one, two, three, or more weeks

and thereafter every second or third day for the period of time that the case demands—some cases for an indefinite time.

It is well to have patients report at stated intervals, so as to make measurement, note progress of case, and to advise the degree for final use.

I have found the most benefit from this method in cases of exophoria with weak adduction: if there is a tendency to fall back on subsequent days, and especially if forty degrees cannot be reached by daily exercise for two weeks, very little benefit has been derived.

Prisms, how worn.—Before prescribing permanent prismatic lenses, I pursue a systematic course of trial lenses, beginning, in the majority of cases, even if the degree is quite high, with a one-half degree prism over each eye, in the eso- and exophorias, and in hyperphoria with one-quarter degree prism, these to be worn constantly for one week or longer if prismatic curvature or discomfort is complained of.

As soon as the trial prisms are comfortable, the degree is increased and again worn for one week or more until accustomed to their use; this continued until the prisms giving the most comfort are found.

In case simple refractive errors are present, they are corrected by trial glasses with the prisms over them. If astigmatism is present of fair degree, it may be necessary to use cylindrical lenses with the prisms—this also applies to compound errors of refraction—in order to select the best formula.

When an error of refraction of higher degree than the muscular error exists, it is best to prescribe lenses correcting the refractive error alone, giving them thorough trial before correcting the muscular error, either alone or combined with prismatic exercise. In this way we may meet with a surprise in an adjustment of a muscular error, sometimes in cases where we look for an increase in the error, *i. e.*, a hyperopia with exophoria becomes orthophoria. How this is brought about I admit is somewhat mysterious,

perhaps by resting the overtaxed muscles, thus allowing them to regain their normal vigor, but, however this is, the fact remains. We occasionally get this result.

If there is latent hyperopia an esophoria may be considerably above fifteen degrees and yet be suitable for treatment with prisms. In fact, it is good practice to prescribe prisms favoring the error as strong as the patient can bear, together with the plus lenses slightly overcorrecting the manifest hyperopia, often combined with prism exercise for several months before deciding on a tenotomy, for very often what in the beginning was a high degree of esophoria becomes orthophoria, or even an exophoria, after all the hyperopia becomes manifest.

The younger the person the more important it is to exercise this precaution, until we are satisfied that the esophoria is fixed and will not yield without a tenotomy.

I am not an advocate of graduated tenotomy according to Dr. Stevens' method :

1. Because I do not believe it a proper procedure to operate in low degree of muscular error.

2. Because I do not believe in the efficacy of severing only the central part of tendon.

I do not feel justified to operate in low degree of error where prisms answer all requirements, and certainly not in a low degree of esophoria, which I consider as advantageous, as soon as presbyopic lenses are required, as they always tend to produce exophoria in accommodation. In a low degree of distant exophoria with increased amount in accommodation, it certainly is more rational to operate, perhaps proper, if there is latent hyperopia.

The method of operation is a modification of Dr. Stevens' method and his instruments are used.

After cocainizing the eye, preparing the field for operation and having hands and instruments thoroughly aseptic, the conjunctiva is seized with the small mouth-toothed forceps at the tendinous attachment, an incision made only sufficiently large to admit the curved scissors, and the conjunctiva separated to an extent depending on the amount

of displacement desired, after which the central portion of tendon is grasped with small forceps and an incision made separating a portion from the sclera, then the small hook is introduced pinching up one-half of the muscle, and the scissors passed, one blade beneath and one above the muscle, severing it close to the sclera, the remaining half is treated in like manner. After this is completed, we ascertain by the exclusion test the amount of correction obtained, which, if not sufficient, may be increased by severing lateral fibers or by separating the tissues with small hook. In case of an overcorrection the muscles may be partly returned and made fast by a suture. An overcorrection of ten degrees in the median line in exophoria may safely be left without suture, as there still will be an exophoria after healing takes place. An esophoria should never be overcorrected, as during the healing and some time after, the correction increases, consequently I prefer to undercorrect in esophoria.

If there is an error of over twenty degrees the amount should be divided between the two eyes.

I think that all will agree that there is a marked difference in the width, thickness and arrangement of tendinous and fibrous attachment in different individuals, consequently we must be guided in each case by the conditions as we find them, irrespective of the muscular error, and govern the operation accordingly.

In exophorias, even with this free separation and overcorrection, there is a marked tendency for a return of the exophoria, which indicates that we are dealing with weak internal muscles, which a displacement of the externi does not overcome, and that the proper procedure would be an advancement of an internal rectus, rather than a separation of the external muscle.

SUMMARY.

1. In all errors of refraction when the degree is greater than the muscular error, give lenses correcting refraction to be worn for some time before taking into account the muscular error.

2. Test all cases of myopia having esophoria, and all cases of hyperopia with marked esophoria under a mydriatic, as in either case the esophoria may be false. In hyperopia slightly overcorrect for distant vision.

3. Strengthen by exercise all weak muscles that will respond and give relief to patients.

4. Correct all muscular errors that will not yield to exercise with prisms permanently, if relief is complete, and when not, until we are sure of the exact muscular state.

5. In latent hyperopia with esophoria of whatever degree, always correct the refractive error either alone or combined with prisms favoring the muscle strain, continuing their use for some time after all hyperopia is manifest, in order to bring about a permanent muscular state before deciding to operate.

6. In low degrees when exercise and prismatic lenses fail to relieve, an operation should only be undertaken with the understanding that it is doubtful if relief will be given.

7. Operate only when milder measures have failed to relieve.

CHENOPODIUM IN OTITIS INTERNA.

BY E. H. LINNELL, M. D., NORWICH, CONN.

CASE I.—Mrs. B., about forty years old, in good health, first consulted me for an affection of the internal ear, in January, 1894, and gave the following history: Four years previously when much debilitated, in consequence of care and anxiety, she experienced suddenly a sensation as of a blow upon the left ear, attended with roaring tinnitus. These symptoms lasted three or four days and disappeared completely. About one year subsequently, that is, three years before consulting me, she awakened suddenly one morning with roaring tinnitus, as of water running over a dam. This has continued with more or less severity ever since, and has been associated with diminished acuteness of hearing. At times there have been intermissions, lasting for days and weeks, when the tinnitus has been very slight or entirely absent, and at such times she thinks her hearing has been normal. She made no mention of vertigo in connection with the initial attack, or with the one occurring a year later, but states that frequently, when the tinnitus has been most severe, it has been accompanied with vertigo, but that for several months she has been free from dizziness.

The subjective sounds she described as synchronous with the action of the heart. They were always most annoying and persistent in the left ear, but the right had not been entirely free from them. She had never had pain in the ears or head aside from periodical sick headaches. Hearing for the voice was considerably impaired, but was not accurately measured. Rhd. (w) = $\frac{4}{80}$. Lhd. (w) = $\frac{18}{80}$. Bone conduction was absent for the fork on both mastoids. Each membrana tympani was in normal condition, save a trifling dullness. She had slight atrophic post-nasal catarrh, without obstruction of the eustachian tubes. She had been previously under the care of a physician who made some claim to special skill as an aurist, but she grew worse instead of better, and discontinued his treatment in despair.

Cautious use of the vibrometer, in connection with internal remedies, gave transient improvement, but at the end of three weeks her condition was the same as at the first visit. She then

remarked that she heard shrill, high-pitched noises better than low sounds, and had most difficulty for the voice. As she expressed it, she heard many sounds that she was not expected to hear, but was deaf for the voice. This at once suggested *Chenopodium*, which was prescribed in the sixth attenuation. This was on January 25, 1894, and was followed by rapid improvement. The remedy was continued four times a day for several months with no other treatment.

On March 17 she reported that she had been nearly free from tinnitus, and had heard much better.

September 6 she said the noise was so slight that she did not "mind it," and that her hearing seemed perfectly restored. *Chenopodium* continued. Since then I have seen her frequently, and she has always given the same report.

Yesterday, August 19, 1895, almost a year since the date of my last prescription, she came into the office, at my request, for examination. Result was as follows: No apparent deafness for the voice, and she stated that she now never had any difficulty in hearing; free from tinnitus except on rare occasions, after loss of sleep or from similar cause, and then so slight as to be scarcely noticeable; no vertigo; mt. of good luster, somewhat retracted, vibrating well with the otoscope. Fork heard distinctly on each mastoid. Rinne positive, right; negative, left. Rhd. (w) = $\frac{2}{6}\frac{7}{0}$. Lhd. (w) = $\frac{3}{6}\frac{3}{0}$.

It is difficult to make a positive diagnosis in this case, but a sudden exudation, serous or bloody, in the labyrinth, followed by inflammation, and preceded and followed by a slight catarrhal otitis media, seems to afford the most rational explanation of the symptoms exhibited.

Our means of curing or even alleviating affections of the internal ear are so meager that anything which promises to extend them is deserving of record. The improvement in the case narrated, it seems to me, may be fairly attributed to the remedy prescribed. The condition had lasted for upward of three years, and had not been benefited by previous treatment. No other treatment was employed while taking *chenopodium*, with the exception of a single application of the faradic electric current at the date of the first prescription, and it is not probable that the one application could have had any decided or permanent effect.

The following case affords further evidence of the value of this remedy in such affections:

CASE II.—Miss C. E. B., age fifty, school-teacher, September 22, 1894. Slightly deaf in left ear for several years; no tinnitus; "conscious of my ear"; sensitive to musical sounds; deaf for the watch and voice. Rmt. normal; Lmt. somewhat retracted and dull; no light spot; good vibration with otoscope. Eustachian tubes dilatable. Rhd. (w) $\frac{3}{6}\frac{6}{0}$. Lhd. (w) $\frac{8}{6}\frac{0}{0}$. Bone conduction diminished from left mastoid. R. Chen. 6x.

October 2.—Rhd. (w) $\frac{2}{6}\frac{1}{0}$. Lhd. (w) $\frac{1}{6}\frac{6}{0}$. Pol. R. $\frac{3}{6}\frac{6}{0}$. L. $\frac{2}{6}\frac{4}{0}$. Ears less sensitive. Continued Chen. 6x.

October 20.—Ears no longer sensitive to cold, but sensitive to cold. Wants to cover them. Cracking in ears when swallowing. "Hearing seems perfectly restored." Rhd. (w) $\frac{2}{6}\frac{2}{0}$. Lhd. (w) $\frac{2}{6}\frac{7}{0}$. Pol. produces stopped feeling and no improv. in hearing. Continued medicine.

December 15.—"No trouble in hearing." Slight sensitiveness still. Rhd. (w) $\frac{5}{6}\frac{2}{0}$. Lhd. (w) $\frac{5}{6}\frac{0}{0}$. Small light spot each mt. Improvement has been permanent.

Here again we had an implication of the left labyrinth in connection with slight otitis med. catarrhalis chronica of both ears.

In the proving of chenopodium we find recorded, "Progressive deafness to the voice, but great sensitiveness to the sounds of passing vehicles, each one of which sounded like roaring of immense cannon right into his ear, the same sensitiveness to other sounds, for example the tea bell; also buzzing in the ears."

This condition, deafness to the voice but sensitiveness for other sounds, was present in both of the cases recorded above, and I have found it a reliable indication for the remedy. In addition, I would like to put on record as cured symptoms, the following, viz.: Absent or deficient bone conduction restored under the use of the drug; roaring tinnitus synchronous with the action of the heart. A consciousness of the ear; sensitiveness to musical sounds and to cold. Hearing better for shrill, high-pitched sounds than for low tones.

ULCER OF THE NASAL SEPTUM. TWO CASES.

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ULCERATION of the nasal septum was, until the last few years, regarded as almost positive evidence of syphilitic infection, tuberculosis, or malignant disease. More accurate observation, however, has shown that there is a class of cases that may properly be considered as simple ulcers, they being entirely independent of any disease or dyscrasia as far as can be ascertained.

Disregarding ulceration due to traumatism, the reasons for which are apparent, the formation of an ulcer is commonly ascribed to the presence of a spur or ridge of bone or cartilage, the apex of which gives lodgment to particles of dust, that adhere, forming crusts which, when dislodged, cause a loss of epithelium. Frequent repetition of this process produces eventually a destruction of the mucous membrane and of the underlying cartilage. This very plausible explanation, I am convinced, does not account for the majority of cases of perforation, for the following reasons :

First.—Ecchondroses and septal prominences are generally located along the sutural line at the base of the triangular cartilage or along its posterior border, while ulceration and perforation, on the contrary, are usually seen near the center or anterior part.

Second.—Ulceration is quite as common on the concave as on the convex surface, though slight erosions and loss of epithelium are frequently observed on any septal prominence.

Most cases, if seen early (excepting those of atrophic origin), show a marked dilatation of adjacent capillary blood vessels, without any evidence of general inflammation. This would seem to point to a diseased condition of the blood vessels as the cause, possibly of the same nature as exists in those cases showing marked dilatation of the blood vessels and hypertrophy of the nose externally. The former condition is usually seen in childhood or early adult life, the latter in individuals past middle age. Is it not reasonable to conclude that a proneness to local engorgement in the nose from some cause may be the determining factor in each? Whatever the cause, the ultimate result, unless relieved by appropriate treatment, is generally a destruction of the underlying cartilage and perforation. Frequent slight hemorrhages are the rule, though the loss of blood may be sufficient in some cases to induce quite a profound anæmia, as in Case I. A perforated septum, though in no sense a grave condition, is often the cause of much annoyance, owing to the tendency of the edges to become eroded or ulcerated, and nervous patients particularly suffer much discomfort therefrom.

Slight recurrent hemorrhages from the nose should always lead us to make a careful examination to ascertain the source. Not unfrequently it will be found to proceed from a septal ulcer.

Unless the vitality of the cartilage is already lost, perforation can be prevented in nearly all cases, and a permanent, lifelong source of discomfort obviated. A dilated condition of the capillaries I believe to be the starting point in most cases, whether due to local or systemic causes. This belief is further substantiated by the fact that when the ulcer heals the opposite side of the septum commonly shows a marked hyperæmia which, as in Case I, results in a loss of epithelium and hemorrhage.

CASE I.—I. R., aged nineteen, called on me for treatment January 23, 1895. He stated that he had had almost daily attacks of nosebleed for past seven months from left nostril, varying from a few drops to a considerable quantity. For past two or three

months he has suffered from weakness, dyspnœa, palpitation of heart on exertion, loss of flesh, and impaired appetite.

Examination of chest gave negative results with the exception of an increased rapidity of the heart's action. Examination of the nose revealed a slight ulceration at the anterior third of the triangular cartilage on the left side. The septum was slightly deflected to the right, and a ridge of cartilage extended backward along the base on the left side about three-fourths of an inch. The ulcer was less than one-fourth of an inch in diameter, and surrounded by an area of swollen membrane and dilated and tortuous capillaries. This tissue was soft and friable, and bled quite profusely from gentle probing. Treatment consisted of careful cleansing and the thorough application of lunar caustic, after which calendula ointment (3 ss of succus calendulæ to ʒj of alboline ointment) was applied, and the patient directed to use the latter twice daily.

One week later found the ulceration covering a slightly larger area, but more superficial and showing a healthy, granulating surface. Hemorrhages less frequent.

Three weeks later the hemorrhages had ceased and the ulcer was practically healed. A similar area on the other side of the septum, however, presented marked hyperæmia and some slight oozing.

This side was treated in a similar manner, and after a second application bleeding was permanently arrested.

During this time the patient had gained several pounds in weight and his health was completely restored.

The only remedy given was ferrum, on general rather than local indications.

He last reported on April 10, saying that he felt well and had had no epistaxis for several weeks. Ulcer healed.

CASE II.—D. B., aged twenty-three years, was sent to me by his sister, whom I had previously treated for a severe epistaxis. He said he had suffered from frequent slight attacks of nosebleed for about four months, and for several weeks past they had been of daily occurrence. His general health was good. Some time every day, however, he discharged a crust from the left nostril which was followed by a few drops of bright red blood.

On examination of the nose, I found an ulcer about one-third of an inch in diameter on the left side near the center of the

triangular cartilage, on the concave surface of the septum. The edges were clearly defined and the base of the ulcer grayish in color, while over a portion of the surface the perichondrium of the cartilage was visible, the membrane and submucosa being entirely destroyed. The blood vessels adjacent showed a condition similar to Case I, though less marked.

Treatment.—After cleansing with an alkaline spray, I applied a sixty-grain solution of nitrate of silver: The patient was directed to cleanse in a similar manner once a day and apply the calendula ointment twice daily, as in the previous case.

I saw him weekly for one month, and again two weeks later, at which time the ulcer had entirely healed, the reproduction of the lost tissue apparently advancing from the periphery of the sore. Some swelling and hyperæmia was observed on the opposite side of the septum, which did not break down, but responded promptly to an application of the silver solution. No remedy was employed.

My reasons for reporting these cases are that they fairly represent a class not infrequently seen in practice, and to emphasize the importance of a prompt investigation of any case giving a history of persistent epistaxis; and further, to dissent from the theory of the origin of septal ulcers (as commonly taught) as arising from the eroded surfaces of spurs or ridges on the septum.

A word regarding treatment. The value of argentum nitrate is too well known to need any explanation. The use of calendula in ulceration, or after operations in the nose, promotes the process of repair in a most remarkable manner, and I am sure that much better results are obtained than from the ordinary antiseptics. Calendula combined with alboline ointment, where a dressing of this kind is indicated, leaves little to be desired; the consistency of the latter being such that it is readily applied to mucous membranes, forming a perfect coating as well as giving a sense of comfort to the patient.

Pledgets of cotton saturated with the medicament used are recommended, but the objection to their use is the vascularity induced by their presence in the nose, which I regard as a decided contraindication.

A FOREIGN BODY IMBEDDED IN THE LENS FOR THIRTY-FIVE YEARS.

BY CHAS. C. BOYLE, M. D., NEW YORK.

RECENTLY a man presented himself for treatment for failing sight of the left eye, the sight of right eye having been lost thirty-five years previously by a blow from a piece of iron, leaving as a result an atrophied eye-ball, which was neither irritable-looking nor tender to touch. On questioning him in regard to the injury, and as to whether there was any likelihood of any iron having entered the eye, he said no, and as thirty-five years had elapsed without any trouble, I concluded he was right. The vision of the left eye was $\frac{5}{200}$, and on examining it closely with the ophthalmoscope, I found the vitreous fluid with opacities floating about in it; lens slightly hazy and on the cornea a small ulcer. Although the atrophied eye-ball was not irritable, I advised its removal, as I thought very likely that the choroid had become transformed into bone, and, from previous experience, I knew this could cause sympathetic irritation in the well eye. He refused at first, and the eye was treated by remedies under which the ulcer healed and the sight improved a little, but I still desired him to have the other eye removed, and he finally consented. It was done without any difficulty, and on opening the atrophied eye ball I was very much surprised to find a piece of iron, not corroded, imbedded in the lens and apparently through the upper part of the ciliary body. The piece of iron is almost spear shape, it being sharp-pointed at one end and broad at the other; it is three-eighths of an inch long and one-fourth of an inch wide at the broad end.

After removal of this eye the other one improved, and now his vision is $\frac{20}{20}$ and the vitreous is free from opacities. The loss of vision that still exists is accounted for by a macula of the cornea, and slight haziness of the lens.

The most interesting point in this case is the fact of the foreign body remaining innocuous for so many years, especially as it was in the region most liable to cause sympathetic trouble. It may not have caused it even now, as the choroid had been completely changed into bone, and that may have been responsible for the condition.

MATERIA MEDICA OF THE EAR.

BY WM. E. ROUNDS, M. D., NEW YORK.

BRYONIA ALBA.—Pressing pains in the ears. Pains in the external auditory canal when stooping or speaking. Contractive pains in the ears with hardness of hearing. Darting pains in the ears. Pains in the ears when using the throat. Discharge of blood from the ears. Ears feel stopped with cracking and roaring in the ears. Pain in the ears when blowing the nose, accompanied by a bubbling, snapping sound. *Bryonia* is not often thought of in connection with ear diseases. In fact, it is not frequently called for in inflammations in this locality. It should, however, be useful in *otitis media serosa* with pain when blowing the nose, speaking, or stooping. I have seen it clear up cases of subacute inflammation of the drum with roaring and cracking sounds in the ears, with extreme hardness of hearing. The remedy was given on account of the muscular (rheumatic) sore throat. There was extreme pain when swallowing or moving the throat in any way. The mucous membrane of the throat was not at all inflamed; but in one case the patient had a cough which caused great pain in the head and ears, and afterward developed a severe attack of rheumatic bronchitis, which phosphorus finally cured.

CALCAREA CARBONICA.—Pressing out pains in the ears. Sharp twitching in the ears, occurring frequently and sometimes causing the whole body to start up. Stitching, tearing pains in the ears, also burning and itching. Sensation of heat in the ear as if hot air were rushing out. Sharp

shooting pains in the ears when blowing the nose. Moist eruption behind the ears with burning pains around the ear, swelling and tenderness of the external auditory canal, The bone behind the ear feels sore and is painful to touch. Painful tumors (enlarged glands) before, below, and in front of the ear. Buzzing and roaring in the ears with deafness. Pain and deafness when blowing the nose, that passes away at once when swallowing. Cracking in the ears when chewing. Purulent discharge from the ears. Polypus in the ears. The ear symptoms of lime are not very characteristic, although they are very numerous, but nevertheless this remedy in its various forms is one of the most valuable we have for the treatment of ear diseases. In the chronic otorrhœa of children it is especially useful. Otorrhœa in large, fat, flabby children, especially if the discharge is bland, yellow, and not very offensive, always calls for *calcareæ carb.* When the discharge is thin and excoriating with enlargement of the glands about the ears; when the glands of the throat are hypertrophied, and the patient suffers from hypertrophic nasal catarrh with scanty ichorous discharge from the nostrils, I have found that *calcareæ iodatum* is the best preparation of lime to give. When a patient is suffering from a wasting disease, gradually losing flesh, with a thin, offensive discharge from abundant granulations in the drum cavity, I have never known the phosphate of lime to fail to produce positive beneficial changes. I have come to prefer the preparation known as *calcareæ hypophosphite*. This remedy is particularly adapted to the treatment of suppurative inflammation of the middle ear in phthisical subjects.

CAPSICUM ANNUM.—*Tearing pains in the ears. Aching deep in the ears. Itching pain deep in the ears. Hardness of hearing with tearing pains deep in the ears with excessive roaring. Swelling over the mastoid process which is red and shiny and exceedingly tender to touch, accompanied by unbearable tearing pains in the temporal bone.*—*Capsicum* is essentially a remedy for acute inflammation of the middle ear. The symptoms are all referable

to deep-seated inflammation, especially in the mastoid process, and are always the result of a periostitis in some portion of the temporal bone. In periostitis will be found the sphere of action of *capsicum*, when the deeper structures of the bone become involved, and suppuration is thoroughly established with infiltration of the tissues, the time of usefulness of this remedy has passed, although it may be called for again by a fresh attack of periostitis. From time immemorial a capsicum poultice applied to the mastoid process has been known to act favorably in many cases of severe inflammation in the ear. This has undoubtedly been due to the absorption of the remedy rather than to the irritant action of the poultice. It is certain that capsicum absolutely masters many cases of periostitis occurring in the temporal bone. It seems to me that the general surgeon should find it a valuable remedy in the treatment of periostitis occurring in other parts of the body.

CARBO VEGETABILIS.—Tearing and burning pains in the ear, referable chiefly to the auricle and meatus auditorius externus. Itching in the ears, itching of the auricle, which becomes hot and red. Itching behind the ears, discharge of a thick, brown substance (fluid cerumen) from the ears. Discharge of a thickish, flesh-colored, badly smelling liquid from the ears; stopped feeling in the ears as if some obstruction were in the external auditory canals. Sensation of great pressure in the ears *as of a load pressing upon the drum heads*, roaring, chirping, humming in the ears. Crackling sound in the ears when moving the jaws. With me this remedy has been useful, chiefly in the treatment of the external ear. In certain forms of eczema of the auricle with a great deal of itching and burning or smarting, and a dry scaly eruption, associated with digestive diseases and a gouty diathesis, I have found carbo vegetabilis a remedy to relieve the whole train of symptoms.

CAUSTICUM.—*Pain in the ears as if the inner parts would protrude, and as if the ears would burst open. Stopped feeling and very uncomfortable pressure in the ears.* All kinds of noises in the ears, roaring and whizzing, with feeling as

though the ears were tightly stopped by a plug. Hardness of hearing with re-echoing of the voice, and steps in the ears. His voice seems to pass out through his ears. *Causticum* is a valuable remedy in some cases of chronic and subacute catarrh of the drum. The leading symptoms to the remedy is the feeling of obstruction in the ears, the patient feels deaf and bores into his ears with his fingers, trying to dislodge an obstruction. I have often cured subacute catarrh of the drum with mild injection of and decided retraction of the membrana tympani with this remedy. This feeling of obstruction is referred to the eustachian region and is probably due to salpingitis subacuta. It is usually associated with a deep-seated itching in throat and ears and a raw, scraped sensation in the upper pharynx. I have also found it a good remedy in the treatment of atrophic catarrh of the drum in old debilitated people and those suffering from phthisis.

CHELIDONIUM.—Long continuing stitch in the external auditory canal going off gradually, whizzing before the ears like wind, sensation in both ears as if wind were rushing out. He had to insert his finger into the meatus in order to stop that sensation. Noise in the ears resembling the distant roar of cannon. Pain in the ears when inserting the finger to remove the sensation of a plug.

CHENOPODIUM.—Deafness to the sound of the voice but exquisite sensitiveness to the sound of passing vehicles; he remarked as each vehicle rolled by, that it sounded like the roaring of immense cannons right into his ears, also annoying buzzing in ears. During all this time his deafness, as described, was progressive and became so pronounced as to make it impossible to talk to him. Still, there was the same kind of sensitiveness to other sounds. For example, when the tea bell rang, though he was in the third story, three flights from where the sound came, he, without notice from members of his family, got up and walked as deliberately as ever into the dining room. This has been a valuable remedy for me in a few cases, with the above rare symptoms. Its action was especially marked

in a case that I will give the particulars of: Mr. O. J., aged forty-one, a very fleshy gentleman, with a nervous temperament and gouty diathesis, was taken during the summer of 1894 with a severe attack of grip that invaded the middle ear. He called at my office and, finding that I was out of the city and would not return for some time, he consulted two old school specialists. They both pronounced his trouble acute inflammation of the drum with congestion of and probably exudation into the labyrinth. Operations upon the membrana tympani and turbinated bones were proposed, but having been a patient of mine for a number of years, he decided to await my return. I saw him first about the middle of September, when he was suffering from extreme deafness, vertigo, and most distressing tinnitus. He was in a very nervous state, and altogether it was almost impossible for me to make myself understood, he could not bear to have me shout at him, and any sudden noise, such as the dropping of a cane upon the floor, or a knocking at the door, would cause him to spring to his feet. The membrana tympani was retracted and *moderately* congested. It was evident that the greater amount of congestion was beyond the drum, and I feared a total loss of hearing, as his mother had quite suddenly become deaf at about the same age, with symptoms very similar to his. After giving gelsemium a trial without a marked success, I placed the patient upon chenopodium anthel. 3x, a tablet four times a day. He very soon experienced relief and gradually improved; his hearing returning as his tinnitus disappeared. At the end of two months all signs of irritation of the labyrinth had disappeared. I then placed him upon ammon. mur. 3x, which rapidly relieved his catarrhal symptoms, and the following spring his hearing was better than it had been for years.

CHINA.—Pressure in the ears with pain. *Ringings in the ears, throbbing noises in the ears. Throbbing in the ears with vertigo and throbbing headache.* Gradually increasing deafness. This remedy has been found useful in the treatment of chronic catarrh of the middle ear in pale, anæmic individ-

uals and those suffering from prostrating wasting diseases or loss of blood. It has also been used with success in some cases of acute congestion of the drum and labyrinth, associated with vertigo and severe tinnitus aurium. This remedy has also been found useful in chronic supuration of the drum. Indolent ulceration of membrana tympani and drum cavity, with passive hemorrhage and without an excessive growth of granulation.

COFFEA.—Music has a shrill sound in his ears; he has to touch his piano very lightly. Hardness of hearing with humming in the ears. He is very sensitive to all sounds; they all sound too loud. Unable to get to sleep because he hears every sound.

CONIUM MACULATUM.—Drawing tearing pains deep in the ear, sharp, shock-like pains in the ears, especially when swallowing. Throbbing in the ears. Violent itching in the ears. Hardness of hearing that comes and goes. The ears are extremely sensitive to sudden sounds. Excessive accumulation of cerumen in the ears. Profuse discharge from the ears of fluid cerumen, sometimes looking like blood, sometimes very black, like tar.

Conium, by virtue of its action on gland tissue, is a valuable remedy to control excessive secretion of cerumen. This condition is usually associated with glandular excitement of the throat and vicinity, and the remedy usually controls the entire train of symptoms.

DAPHNE MEZEREUM.—Severe drawing pain in the ears. Tearing pain deep in the ear. Severe neuralgic pain in the ears. A heavy, bruised, aching sensation. Itching in the ears relieved by rubbing. A sensation as if the ear is obstructed. Biting, itching eruption behind the ears. Obstinate itching eruption behind the ears that exudes a sticky moisture. *Mezereum* is a good remedy for a certain form of eczema of the auricle associated with a thick sticky discharge which forms a thick crust, and underneath which is found thick whitish yellow pus. Severe neuralgic pain is usually associated with it.

THE SENSITIVINESS OF THE EYE TO THE
COLORS OF THE SPECTRUM; THE FUNC-
TIONS OF THE RETINAL ELEMENTS AND
VISUAL PURPLE.

BY H. PARINAUD, PARIS, FRANCE.

DURING the year 1884, while conducting a series of experiments, having in view the determination of the luminous intensity of different regions of the same spectrum, I at once became aware of the fact that such a determination was impossible, because the relative intensity of different rays varies from one moment to another. In searching for the cause of these variations of sensitiveness which contrast so forcibly with the stability of the physical energy that produces them, an energy that stands necessarily in a fixed relation for rays of the same spectrum, I have been led to the discovery of certain properties of the retina which I consider fundamental, and a knowledge of which is indispensable, in order to understand the functions of the visual apparatus as well as certain phenomena relating to the science of optics. The results of these first experiments are embodied in two papers in the Academy of Sciences.*

I should, therefore, be able to resume the study of these facts, aided by a disposition more *en rapport* with the object to be attained. Moreover, these new experiments have not only confirmed the results of the earlier ones, but they have made obscure points clear, fixed the facts,

* *Sur l'intensité lumineuse des couleurs spectrales*, 24 November, 1884. *Sur l'existence de deux espèces de sensibilité à la lumière*, 26 October, 1885.

determined their significance and established their relations.

The instrumental preparations should realize the following conditions :

1. To give a positive spectrum, which can be received on a ground glass plate.
2. To permit the modification of the intensity of this spectrum and the numerical valuation of the differences of intensity.
3. To permit the isolation of different parts of the spectrum and the observation of these parts in the form of a slit or a

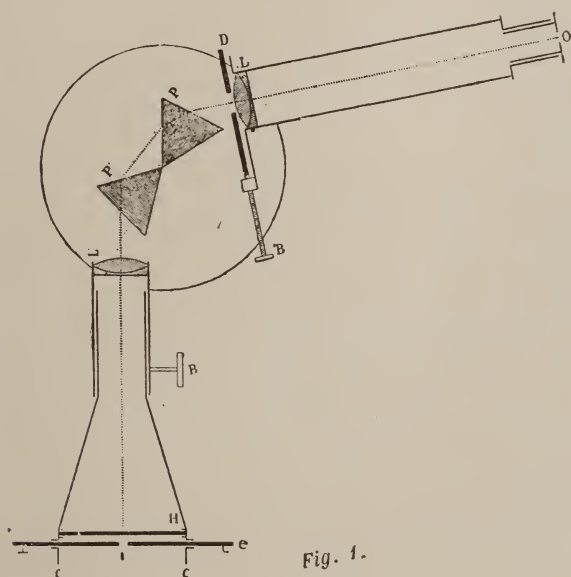


Fig. 1.

more or less extensive surface, for the exploration of the retina in general, or in the form of a very small point for the examination of the macula.

These conditions may be easily realized by means of certain modifications in the ordinary spectroscope* (fig. 1).

A positive spectrum may be obtained by removing the lens of the eyepiece and leaving only that of the objective, that is, the converging lens L' , which receives the rays as they emerge from the prism. The power of this lens will depend upon the length

*This instrument is made by Pellin, the successor of Duboscq.

of the spectrum desired, and the distance of the ground glass screen upon which it is to be received. This lens and that of the collimeter *L* form a refracting system, which gives in the conjugate field of the slit of the collimeter an image of that slit. If a prism or a series of prisms, *PP'*, be interposed between these two lenses, the image of the slit will become the spectrum *AH*, in which, after the double refraction, prismatic and lenticular, the red rays will fall upon the field at the extremity *A*, and the violet rays at *H*.

The ground glass which receives the spectrum, being situated at the extremity where the eyepiece is found in the ordinary spectroscope, the focus is governed by means of a ratchet screw, *B'*, attached to the instrument. The tube that supports the glass enlarges in the shape of a pyramid, so that the whole spectrum may be received at one time without displacing the glass horizontally.

It is possible, moreover, by means of a special adjustment, to adapt the eyepiece to this same setting, so as to obtain with one instrument a virtual spectrum as in the ordinary spectroscope, and also a real spectrum.

To modify the intensity of the spectrum, recourse is had to *O*, the slit of the collimeter, but this method, employed by Vierordt and others, is altogether insufficient. In order to make measurements at all precise, it is necessary to place at the point where the rays leave the slit, a screen with a variable opening, so arranged that the number of rays going to form the spectrum may be easily graduated.

If the slit is lighted by a luminous object placed before it, giving divergent rays, and if this slit is in the field of the lens *L* of the collimeter, the rays utilized for prismatic dispersion form, as they leave the lens, a cylindrical bundle of parallel rays having the diameter of the lens. If a screen with a variable opening *D* is placed close to the lens, it is possible to modify the intensity of the spectrum easily and in a regular manner, by varying the size of the opening in the screen. It can be demonstrated that the intensity of the spectrum, or of each part of it, is proportional to the surface of the opening in the screen. The opening in the screen being a square, and the length of one side being indicated in half millimeters on an ivory rule, therefore, to obtain the surface of the opening, the values indicated must be squared.

But this is true only if the slit in the collimeter allows rays to pass which light the whole surface of the lens uniformly. This is the case where the spectrum is obtained from a luminous object placed directly before the slit or from a mirror reflecting cloud light. It is not the case with solar rays falling directly on the slit. The lens receives and transmits only a slender bundle of parallel rays, and the intensity of the spectrum is not proportionate to the surface of opening of the screen. If direct solar light is to be used, it is necessary to place a lens of short focus before the mirror of the heliostat and the aperture of the collimeter in the focus of this lens. A ground glass plate may be placed in the field of the lens and used as a source of light, the rays being dispersed as they pass through it. I take this method when I wish to make use of solar light for my experiments. By placing the ground glass more or less distant from the focus, a less or more intense illumination is obtained. Direct solar light is very difficult to manage and almost useless in the experiments of which I shall speak on account of the likelihood of very considerable errors in reckoning, when it is necessary to use very feeble intensities of light.

The different parts of the spectrum are isolated by means of a blackened brass screen, perforated with a slit. This screen, placed before the ground glass, works in a groove, so that the slit may be brought opposite to different parts of the spectrum.

The position of Fraunhofer's lines is previously determined and marked on the ground glass in pencil. In this way it is always possible to study the part of the spectrum containing these lines, even with a spectrum as elongated as that produced by artificial light. It is sufficient to make the sodium line, which is very easily obtained, coincide with the line D on the ground glass. Furthermore, since the pure yellow which corresponds to the line D is very condensed, it is easy, with a little practice and by the aid of the aperture in the screen, to recognize the D rays in the continuous spectrum without using the sodium.

Upon the upper border of the screen, in a prolongation of the aperture, is a needle which may be made to correspond with the lines of the ground glass, and thus allow the aperture to be placed in any part which is to be studied, without looking at the spectrum.

Experiments with the spectral colors should be carried on

under two different conditions : by daylight, that is, when the eye is exposed to the surrounding light, and in darkness.

In the first case it is necessary to avoid, as much as possible, the reflection of the surrounding diffuse light from the ground glass where the spectrum appears. This result is partly obtained by the perforated screen, but the blackened glass still reflects considerable light, and it is well to paste upon its interior face a piece of velvety black paper, which is very absorbent. On the outside, at the extremity of the tube which carries the ground glass, is adjusted a black wooden frame C, which forms a quadrangular muff from 5 to 6 cc. in depth. Finally, if a black veil is placed behind the observer, and he wears a mask of black material with openings only for the eyes, the reflected light is reduced to a minimum, and the slit lighted by the color of the spectrum is thrown upon an absolutely black field.

The slit in the screen is 15 to 20 millimeters in height, according to that of the spectrum. The width varies according to the length of the spectrum and to whether rays of neighboring wavelengths are desired. For a luminous spectrum of eight centimeters, I use a slit one-half millimeter in width. The examination of the fovea requires a very small opening. For this purpose a piece of black paper is pasted over the slit and an aperture made in it with the point of a needle.

For examinations in darkness, the wooden frame which incloses the ground glass is replaced by a cornucopia twenty centimeters in length, also of wood, and furnished with an eyepiece at its apex. This cornucopia ought to have a certain amount of motion in the horizontal plain, so that it may be possible, in observing each color, to change the eyepiece, and, therefore, the eye of the observer, in the plane of incidence of the rays upon the ground glass. By this method the intensity of color varies according to the greater or less obliquity of the direction of vision.

If the experiments are not made in an absolutely dark cabinet, the observer should take the precaution of covering his head and the glass with a black veil. He should be sure, among other things, that the eye, after remaining for twenty minutes in darkness, perceives no heterogeneous light when the slit of the collimeter is closed. This is difficult to accomplish, but success may be attained if the precautions that I have indicated are

carried out, together with any others that may occur to the observer.

These arrangements ought to serve the following purposes :

a. To determine the sensitiveness of the eye to the different parts of the spectrum of daylight, that is, while the eye is exposed to the surrounding diffuse light ;

b. To determine the sensitiveness to the same spectrum when the eye has been subjected to darkness for from twenty to thirty minutes ;

c. To compare the sensitiveness of the fovea with that of other parts of the retina.

I have given the name *non-adapted retina* to those experiments where diffuse light is used—that is, where the conditions are the same as in ordinary vision ; and *adapted retina* to those where the action of all light upon the eye is removed for from twenty to thirty minutes previous to the experiment.

The first fact deduced from a comparison of the retinal sensitiveness for the same spectrum in these two different states, is that the increase of sensitiveness produced by darkness (or adaptation) is *unequal for rays of different refrangibility*. While amounting to zero in the red, this increase is augmented according as the regions examined approach the violet extremity of the spectrum, where it reaches considerable proportions. The same is true of the ultra-violet rays.

To give a numerical value to the sensitiveness of the eye to different rays, we must take as a unit of measure the smallest quantity of light that can be perceived by the eye, when it has attained its maximum degree of sensitiveness by a sufficiently long subjection to darkness. The rays perceived with the fullest intensity of light under these conditions are those situated between the lines E and F.

In order to fix these values we must regulate the source of light or the slit of the collimeter, so that the rays may be perceived with an opening in the diaphragm graduated to one square millimeter. The sensitiveness of the eye for

different rays will then be inversely proportional to the number of square millimeters contained in the opening of the diaphragm, made just large enough to allow these rays to be perceived. The following table indicates the sensitiveness of the eye for rays in the neighborhood of the lines of Fraunhofer. The two series of figures placed below each letter express: the first, the sensitiveness of the *adapted retina*; the second, that of the *non-adapted retina*.

	A	B	C	D	E	F	G	H
Adapted retina, ..	$\frac{1}{400}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{10}$	1	1	$\frac{1}{100}$	$\frac{2}{50}$
Non-adapted retina, ..	$\frac{1}{400}$	$\frac{1}{100}$	$\frac{1}{60}$	$\frac{1}{100}$	$\frac{1}{500}$	$\frac{1}{1500}$?

To make the significance of these figures more apparent let us look at the two curves in fig. 2. The different parts of the spectrum are indicated by the verticals, continuing the lines of Fraunhofer in the scheme of the spectrum above the figure. The minimum intensities necessary for the perception of the different parts of the spectrum are shown by the figures opposite the horizontal lines.

The lower curve, *bg*, expresses the sensitiveness of the non-adapted eye; the upper curve, *bh*, that of the adapted eye. The degree of sensitiveness is naturally inversely proportional to the figures expressing the intensity.

We note, first of all, that the summit of the curve indicating the maximum luminous intensity of the spectrum is not the same for the non-adapted and the adapted retina. For the non-adapted eye the maximum is in the yellow at D, with very little difference from C to E. For the adapted eye, which has remained twenty minutes in the dark, the maximum is found at E, with very little change up to F. It is not correct, then, to say that a spectrum has its maximum intensity in such and such a part, since *this maximum changes according to the degree of adaptation of the eye*; the less the eye is adapted, that is, the greater the intensity of the neighboring light, the more this maximum is displaced toward the red. In some experiments made before a window, receiving direct solar light, I found the maximum in

C. The more the eye is adapted, that is, the longer the eye has remained in the dark, the more the maximum is displaced toward the violet extremity.

We see that the two curves are the same as far as the line C, which shows that for the red as far as C, the effect of adaptation is nothing. Proceeding from C the two curves separate and the value of the verticals comprised between them expresses the increase due to the adaptation of the retina. These values for the different regions of the spectrum are as follows :

A	B	C	D	E	F	G	H
	o	o	50	100	400	1400	?

It is not necessary to attach an absolute value to these figures. They give the mean of a number of reckonings made with a spectroscope having a double flint prism with an *Auer* burner as a source of light. The objective intensity of different parts of the spectrum necessarily varies in accordance with the nature of the refracting substances and the source of light employed. But these variables are not the only ones that can modify the results. There are others much more important pertaining to the variations of retinal sensitiveness, the cause of which we will now begin to study. It is not the figures themselves that we must consider, but the remarkable phenomenon that they express, which may be deduced from our experiments with perfect clearness. This phenomenon is the very unequal action of darkness upon the retinal sensibility to spectral colors according to their refrangibility.

The influence of darkness is *nothing for the red rays* as far as C or even a little further. It is important to determine if the influence of darkness upon the perception of the red rays is only very feeble in comparison with the other colors, or if it is actually *nil*. In this part of my experiments I have experienced great difficulty in obtaining spectral colors absolutely pure, even with a well-constructed instrument, and while taking every precaution that no light should be admitted to the apparatus; except in the regu-

lar way through the slit in the collimeter. With all these precautions there still remains the dispersion by the lenses and prisms, and the reflection of the walls even though covered with very absorbent, velvety black paper. But after the greatest care in following out these conditions, it is found that the red rays of the spectrum are perceived with a little more feebleness of intensity when the retina is adapted than when it is not ; which seems to indicate that the sensitiveness of the retina is augmented by darkness, for this color as for the others. But, if we place before the slit of the collimeter a red glass that is absolutely monochromatic we suppress the error resulting from dispersion and reflection and obtain an absolutely pure red. Under these conditions it appears that the influence of retinal adaptation is *nil*.

The increase of sensitiveness produced by adaptation, already very appreciable at the line D, is augmented very rapidly when we approach the lines E and F, where the spectrum attains its maximum intensity for a retina that has been subjected to darkness for twenty minutes. The influence of adaptation is still very considerable in the region of the violet rays. I have been able to measure this difference, with precision, only as far as the line G. The relation between the sensitiveness of the adapted and non-adapted retina in this region is about one to fourteen hundred, the examination of the non-adapted retina being made with the surrounding light of a mean intensity, such as is obtained from a clear sky, at a window not receiving direct sunlight. But the difficulty in determining this difference exactly lies in obtaining a fixed light, such as daylight. The property of the retina which we are studying shows that its sensitiveness to rays of greater refrangibility varies incessantly, according to the degree of adaptation and the intensity of the surrounding light. The result is that, while it is comparatively easy to determine the curve of sensitiveness of the adapted eye, it is much more difficult to fix that of the non-adapted retina, one extremity of whose curve is constantly oscillating in accordance with the

intensity of the surrounding light. I would repeat that in this class of experiments an absolute value must not be given to the figures, but only the facts which they bring out and the function of which they give evidence should be considered.

I am unable, at present, to more than approximate the influence of retinal adaptation in the perception of the violet rays in the region of the line H, still less of the ultra-violet rays. This is one of the points of comparison in which we are at fault, since, for the non-adapted retina the spectrum becomes invisible toward the line H, even with direct sunlight, which is the most intense light that we possess.

The increase in the sensitiveness of the retina subjected to darkness presents another no less remarkable characteristic. This increase does not affect the total sensibility of the eye to simple rays, a sensibility which is composed of two distinct elements, that of the perception of light, properly so called, and the perception of color. *This increase of sensitiveness affects only the luminous intensity of the color, which, while appearing more luminous, becomes less saturated.* The effect produced by this subjective modification of the visual apparatus is the same as if white light were added to the color observed. Finally, the sensitiveness to brightness becomes so preponderant that, with a feeble intensity, the *purest color is seen as white*, or at least, gives a peculiar luminous sensation, such that it is impossible to distinguish by what color it is produced.

To be sure this is true only for rays the perception of which is modified by retinal adaptation. Provided it be pure, the red, not being influenced by adaptation, remains red always, whatever may be the degree of adaptation of the retina or the intensity of the color.

As a result of these two properties of the retina it may be stated that certain subjective conditions cause variations in the luminous intensity and the saturation of colors. In other words, the exciting cause remaining the same the sensation varies in intensity and in quality.

This functional modification of the retina subjected to darkness, which augments so remarkably its sensitiveness to certain rays, altering totally the sensation which determines these rays, *is totally lacking in the fovea*, that is to say, in that part of the retina which is functionally most important in that it is the seat of central vision. This is the third important fact of which our experiments have given evidence.

The examination of the sensitiveness of the fovea offers peculiar difficulties, dependent upon the fact that it does not participate in the increase of sensitiveness which characterizes the adapted retina. As a result, it is a thousand times less sensitive to certain rays than the adjoining parts. Consequently in the examination of these rays there is a tendency to fix the luminous object, not upon the fovea, but upon the more sensitive areas adjoining it. This difficulty in the procedure may be successfully overcome in the following manner:

Over the slit in the screen intended to isolate the different parts of the spectrum is pasted a piece of black paper in which a small opening is made with the point of a needle. In this way the light to be examined appears as a luminous point. Through this point an imaginary vertical is made to pass, and along this the observer endeavors to direct his gaze, from above downward and from below, upward. If too great an intensity is not given to the luminous point it is noticed that at certain moments it disappears; this is because the image of the point is formed upon the fovea. The observer then endeavors to maintain a fixed gaze and increases the intensity of the luminous point until something new appears, that is to say, until the intensity is great enough to produce an impression upon the fovea. After a few trials, the degree of sensitiveness of the fovea for the light in question can be determined without much difficulty. It can then be compared with that of the adjoining parts of the retina by changing the line of vision more or less in different directions. This second determination is not difficult.

The part of the central visual field where the insensibility reaches its maximum is much restricted. Outside of this there is a zone in which the difference between it and the peripheral sensitiveness tends to become obliterated. The exact boundaries of these areas are very hard

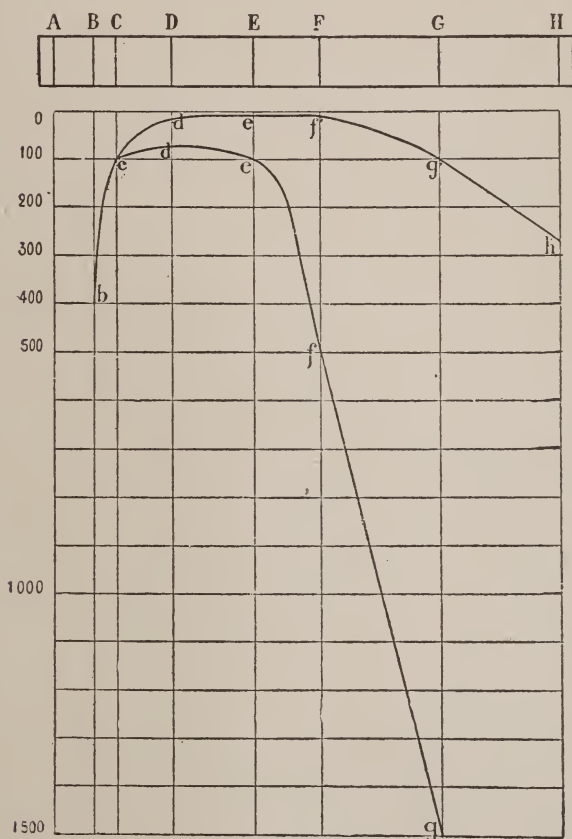


Fig. 2.

to define on account of the difficulty of immobilizing the eye under these conditions, the difficulty of monocular accommodation for a luminous point in darkness, the diffusion circles that are produced, etc. With the adapted retina, a comparison of the sensitiveness of the fovea with

that of the peripheral areas, with different rays, shows at once that *the difference, which is nothing with the red rays, increases as the neighborhood of the violet rays is approached.* That is to say, if we express this difference by two curves, we obtain a result similar to that expressing the general sensitiveness of the adapted and non-adapted retina (Fig. 2). It is noticed also that this difference between the sensitiveness of the fovea and that of the adjoining parts tends to disappear when the surrounding light is intense and is increased according as the retina is subjected to darkness.

Thus the fovea does not participate in the increase of sensitiveness which characterizes the adapted retina.

I conclude, as a result, that the fovea should, under all circumstances, give the amount of sensitiveness of the non-adapted retina with greater accuracy, probably, than by the means we have used to determine the curve *bg* (Fig. 2). For this curve represents the retinal sensitiveness when the surrounding light is of the least possible intensity and not a state of absolute non-adaptation, which is very difficult to produce.*

Concerning the sensitiveness of the fovea, one important peculiarity remains to be noted. *Simple rays produce primarily a sensation of color, whatever their intensity may be, or whether the retina be adapted or not.* This is contrary to what we have observed at the periphery, where, with feeble intensities, colors other than red produce a sensation of light without the sensation of color. This fact is easy to establish with most of the colors, although some difficulties are encountered with the yellow and extreme violet rays. In regard to yellow the difficulty is due to our habit of considering artificial light as being white, while in reality it is yellow. For violet rays the difficulties are of a different character. They are due to the great sensitiveness of

* My instrument does not permit me to establish the curve of sensitiveness of the fovea and the peripheral parts with enough precision while using the adapted retina, because it does not give differences of intensity sufficiently large to allow direct measurements with the same intensity of the luminous source. In having it made I did not suspect that I should have to measure such considerable differences.

the parts of the retina adjoining the fovea, to the white value of violet, to the phenomena of dispersion necessarily produced by the refracting media of the eye, and finally to the fluorescence of the latter. But these exceptions, or rather these causes of error, do not invalidate the general law.

PHYSIOLOGICAL DEDUCTIONS.

Three principal facts may be deduced from these experiments:

1. The increase of sensitiveness of the retina, subjected to darkness, acts unequally with colors of different refrangibilities. While it is nothing for spectral red, this increase augments as the violet extremity of the spectrum is approached, at which point it becomes considerable.

2. The increase of sensitiveness of the retina, subjected to darkness, acts only upon one of the factors which determine the sensation of simple rays, that is, the brightness or luminous intensity. The color, while appearing brighter, seems at the same time less saturated and appears to be diluted with white. Finally, when the retina has been subjected to darkness a sufficiently long time, the purest spectral colors, always excepting red, appear white, with a light of feeble intensity.

3. This increase in sensitiveness in the retina, subjected to darkness, does not hold good for the fovea.

It is known that the part of the retina serving for central vision is of different structure than the other parts of that membrane. It is distinguished especially by the absence of the rods and of the visual purple, and contains only the cones. The absence of the rods was recognized long ago by Henle, and has been confirmed by a great number of histologists. Concerning the absence of visual purple in the fovea, and to a certain extent in the region of the macula, the remarkable works of Kuhne* leave no room for

*W. Kuhne, "Sur le pourpre visuel"; "Recherches faites au laboratoire de physiologie de l'Universite de Heidelberg," vol. i, fac. 1, 2, et 3, Heidelberg, 1877.

doubt. Visual purple is totally absent in those animals whose retinae contain only cones (pigeons, chickens, and adders). On the contrary, it exists in abundance in those species where the rods predominate or are even found exclusively (the screech owl and eel). These results are confirmed by examinations of the eyes of human beings who have died in the dark. The purple color is absent in the macula, and for a distance of two millimeters around it. The photochemical coloration, which is very pronounced in the parts about the rods, is wanting in the cones, as in animals. Moreover, when a colorless element is discovered a more careful examination shows that it acts as a cone.

This fortunate circumstance allows us to deduce from our experiments the respective rôles of the cones, the rods, and the purple.

Since the increase in the sensitiveness of the retina, subjected to darkness, is absent in the fovea, which contains only cones, we must conclude that these elements are not concerned in this phenomenon. Moreover, since it occurs in those parts of the retina which contain the rods and purple, we must conclude that this function pertains to them.

In fact, the two species of retinal elements, the cones and the rods, have entirely distinct functions in the sense of vision.

The method by which light produces its impression is different in the rods from what it is in the cones. The action of light upon the retina is determined by directly appreciable physical modifications, three of which are well known and are: The modifications of the retinal purple (Boll, Kuhne); the migration of pigment (Brücke, Boll, Czerny, Angelucci, Kuhne); and the modifications of the form of the cones (Angelucci, Van Gederen Stort, Engelmann).

There is, however, a distinction to be made in these objectively appreciable modifications of the retina. The change in the form of the nervous elements and the migration of pigment may be produced by physical agents *other*

than light, such as the electric current, heat, and even sound. They may also result from nervous reflex excitation (Engelmann). On the other hand, the purple seems to be modified only by the action of light. This peculiarity gives it an especially strong rôle as a specific element.

The visual purple pervades only the outer extremity of the rods, and is absent where the cones are found alone. It is directly in accord with the action of light upon the rods. This fundamental fact differentiates the mode of action of light upon the two classes of elements.

The purple is secreted by the layer of pigment epithelium. There is, moreover, an evident correlation between the migration of the pigment cells along the rods and the destruction of the visual purple by light. Nevertheless, this migration of the pigment cells does not seem to be immediately dependent upon modifications of the purple, although it is produced in a less evident manner in the retina of reptiles, in which the layer is entirely of pigment epithelium, and the retina contains cones without rods, and consequently without purple (Angelucci).

The sensation given us through the rods is different from that given us through the cones, as is clearly shown by our experiments. The increase in the sensitiveness of the retina, subjected to darkness, a function of the rods and purple, affects only the brightness or luminous intensity of the color. While the color observed appears more luminous, it seems at the same time less saturated. The result of this subjective modification of visual sensibility is the same as though white light were added to the color. With a sufficiently feeble intensity the purest color becomes white, because such an intensity is powerless to excite the cones; it excites only the rods which are sensitive to far feebler quantities of light, due to the action of the visual purple. We must conclude, then, that the rods give us only the sensation of colorless light.

In the fovea, on the contrary, a simple light, sufficiently pure, is perceived primarily as a color, whatever its intensity, or whether the retina be adapted or not. Taking into

account the sources of error that I have mentioned, this fact should, I believe, be considered as a law. We must conclude, then, that *the action of simple rays upon the cones gives us primarily a sensation of color*. It is the impression upon the cones which is specialized in the visual centers in a sensation of color, supposing these centers to be intact, while the action of the rods will produce only a sensation of colorless light.

It may be said, regarding this subject, that I attribute the sensation of light to the rods and the sensation of color to the cones. The question is, unfortunately, not so simple. The action of the rods is a superadded action which is not indispensable for diurnal vision. If we were deprived of the aid of the rods and visual purple, as is the case in many animals, light rays would still continue to produce a double sensation of light and color. With cones alone of perfect structure we would be able to perceive differences of luminous intensity with no sensation of color, if we suppose the visual centers of the brain to be unable to develop this sensation. I believe, in fact, that the chromatic function is of cerebral origin. It is the only opinion that I have ever expressed on this difficult question,* and was, among others, the opinion of Newton. In referring the chromatic function to the visual centers, the question seems to disappear from our theoretical speculations; while at the same time it is simplified in so far as the retinal functions are concerned. If the specialization of the impression of the sensation of color is a cerebral act, the multiplicity of our color sensations does not require in the retina and optic nerve special elements for their transmission. It is no longer necessary to admit either an indefinite number of fibers, or even three or four species of fibers, for the fundamental colors. In the telephone a metallic thread transmits not only differences of intensity, but also differences in tone, and even in *timbre*. Why should we refuse a similar power to the optic fibers.

The manner of excitation of light rays is such that the

* "De la sensibilité visuelle," *Acad. des Sciences*, Août, 1884.

resulting sensation is different in the cones and in the rods. There are in reality two superimposed functions of the human retina, two retinæ, fused together in some way, each of which has a distinct physiological rôle.* The cones constitute the fundamental elements of the human retina. It is through them that the different undulations of the luminous agent that gives us the sensation of color is transmitted to the nerve centers. It is evident that to them is also given the principal rôle in that faculty of the retina which differentiates the geometrical distinctions of luminous impressions which result in the perception of form. Excitation of the rods, on the contrary, only aids in the perception of luminous sensations more or less diffuse. The works of Ramon y Cajal, upon the structure of the retina, tend in the same direction. They show that each cone is connected with a bipolar cell, while a single bipolar cell is affected by several rods.

The rods and purple are connected with a superadded function which is not essential, that is, nocturnal vision, which is probably due to increased sensitiveness, of which the visual purple is the agent.

This last conclusion, which follows naturally from the experiments that I have reported, is confirmed by clinical observation. Before making these experiments I had undertaken researches concerning hemeralopia. Having recognized that in this condition the general cause of sensibility of the macula is not modified, I concluded that this affection is produced by a deficiency in the secretion of purple, an explanation since admitted by different authors. As a consequence, I submit once more that the rods and purple are connected with nocturnal vision.†

In this way I have arrived at the same conclusion by two different paths and with no preconceived ideas; for my experiments upon the spectral colors were undertaken

* "Sur l'existence de deux modes de sensibilité à la lumière," *Acad. des Sciences*, October, 1885.

† L'héméralopie dans les affections du foie (*Arch. Gen. de Méd.*, Avril, 1881). L'héméralopie et les fonctions du pourpre visuel (*Acad. des Sciences*, Août, 1881).

in a different direction, which was the determination of the relative luminous intensity of different rays of the same spectrum. This is an example of the coincidence which often occurs between clinical and physiological experiment in the study of the functions of vision.

If these conclusions be true, it is easy to predict that the rods and purple will be especially developed in nocturnal animals. This fact is, indeed, demonstrated by the study of comparative anatomy (Schultze and Ramon y Cajal). On the other hand, we would expect that animals deprived of purple, as most birds are, would be hemeralopes. The old saying "to go to bed with the chickens," as applied to one who retires early, has its origin in this fact.

(To be concluded.)

MATERIA MEDICA OF THE NOSE AND THROAT.

BY A. WORRALL PALMER, M. D., NEW YORK.

CAUSTICUM.

Nares.—(*Subjective*).—Frequent sneezing (bry. = frequent sneezing in morning when moving).

(*Discharge*).—Stopped coryza.

(*Epistaxis*).—Bleeding.

(*Olfaction*).—*Loss of sense of smell, with or without stoppage.

Naso-Pharynx and Pharynx.—(*Subjective*).—Tension in right side of throat and chest, drawing body toward right side. Rawness, with tickling and with dry cough, and expectoration only after long coughing. Dryness when swallowing, then scraping down the throat. Dryness of back part (phyto. = pharynx dry, rough, feels like a cavern). *Acute soreness of throat, with laryngitis. *Pharyngeal paralysis, especially after diphtheria. *Anæsthesia of pharyngeal mucous membrane.

(*Discharge*).—*Mucus*, after dinner, which he cannot loosen by hawking, *but is obliged to swallow*. Hawking of mucus. Hawking of mucus, with pain in pit of throat.

Larynx and Trachea.—(*Objective*).—*Mucous membrane of larynx dry, glazed, and atrophic. *Dry catarrh of larynx. *Posterior half of vocal cords injected. *Acute laryngitis. *Lack of co-ordination of cords as sequela of laryngeal catarrh (phos. = irregular action of vocal cords. Graph.). *Mucous membrane anæmic in chronic laryngitis (ars. = anæmic or dirty red and puffy). *Vocal cords

gray or dingy; they come in contact, but separate before tone is produced, the muscles being so weak that inspiratory current forces the ligaments asunder. *Diminished size of small papillomata of larynx (calc. c. and con. mac.).

(*Subjective*).—Dryness of larynx. Dryness of larynx and trachea. Pain in larynx on blowing the nose. Frequent need to clear something out of larynx. **Muscles of larynx do not perform their function, and inability to speak a loud word.* **Hoarseness < in morning and evening, with scraping in throat.* Hoarseness in morning, with rawness and soreness in throat (bell. and benz.). Irritation to cough, even in morning in bed. Irritation to cough with every expiration (acon., bell. = irritation to cough, and cough on inspiration). Arrest of breath while speaking or walking rapidly, with necessity to suddenly catch for breath. Short breathing. *Sudden aphonia after taking cold. **Loss of voice from over-exertion.* When given a few hours before singing, etc., it tones up the vocal muscles (arum. tri., hepar s. c.). *Excessive rawness, especially under sternum, caused by coughing. *Larynx feels tired and sore from talking. *Voice ends in a high squeak when attempting to produce high note. *Hoarseness of singers < in morning in dry, cold weather.

(*Discharge*).—*Expectoration usually scanty; must be swallowed. (This drug has the least amount of expectoration of any of the kalis.—T. F. Allen.)

(*Cough*).—Cough wakes her morning and evening, > during the day; c. always caused by speaking. C. caused by crawling in larynx, or by stooping to pick up anything. Tickling c. Violent c. at times, dry, with pain in right side of abdomen. Hollow c. < night and morning (phos.), with adherent mucus in chest, in which is sticking soreness and ulceration, with and without coughing, with stopped coryza. *Dry, hollow c. in paroxysms, *with a sore streak down the trachea, where it pains on every paroxysm of coughing.* C. < by warmth of bed, > by sips of cold water (cupr. met., brom.). *C. with sensation as if "could not get under the mucus" to raise it (rumex). **Constant hacking c. with involuntary micturition.*

Characteristics and Concomitants.—Weakly scrofulous persons, with pale, sallow complexions, dark hair, and rigid fiber.

Very peevish ; melancholy ; weakness of memory.

Stitches in temples ; feeling as though too tight.

Eyelids feel weak, can scarcely keep them open ; obscuration of sight.

Hammering, roaring, buzzing, and other noises in ears ; words and steps re-echo in ears.

Pale bluish lips ; painful swelling of left submaxillary gland.

Scorbutic affection of gums.

Great aversion to sweets ; fresh meats nauseate.

*Pain in right side of abdomen accompanying violent cough.

*Involuntary emission of urine, when coughing, sneezing, blowing nose, or walking.

Soreness in chest ; stitches in chest below arms, extending to pit of stomach ; tightness of chest ; must frequently take breath ; rattling in chest ; oppression of heart, with lowness of spirits.

Painful stiffness in back ; aching pain in small of back when sitting.

Drowsy weariness in daytime.

CEPA.

Nares.—(*Subjective*).—Severe prolonged sneezing, *frequent sneezing*, also in evening on entering warm room, **Obstruction of nares* on entering warm room, interfering with nasal respiration, > in cold room (sang.=obstruction on coming in warm atmosphere). *Itching in nares, nasopharynx, and conjunctiva (natr. mur.=itching in nose and throat). **Sneezing < by dust or onions*. In 30x or 200x potency it is prophylactic in suspected hay fever.—Ivins.)

(*Discharge*).—*Catarrh with headache, also < in evenings*. *Catarrh with heat, bland lachrymation, headache, and acrid, burning discharge, making lip red and excoriated (euphr.=nasal discharge bland and lachrymal, excoriating.

(Merc. sol.=discharge excoriates the alæ and columnæ of nose. Arum triph.= discharge excoriates both upper lip and nostrils). **Discharge* > in open air and < in warm room with headache (puls.). *Copious watery discharge*. Discharge dropping in evening in street, with sensation of coryza.

Naso-Pharynx and Pharynx.—(*Subjective*).—Constrictive pain in region of os hyoides, then lower down posteriorly in right side. Pain extending to ear. *Tickling in naso-pharynx, nares, and conjunctiva. *Roughness and rawness in pharynx and tickling in larynx causing cough.

(*Discharge*).—**Post-nasal discharge of clear watery fluid* (merc. c., spig.).

Larynx and Trachea.—(*Subjective*).—**Tickling with constant inclination to hack*. Throbbing and contracted sensation in larynx (brom). **Hoarseness* (brom.). Obstruction to breathing in middle of upper chest. *Sensation as if larynx would split. (Hepar s.= painful shock in larynx caused by cough). **Sensation of laryngeal mucous membrane as if would be torn out in coughing, with profuse lachrymation*.

(*Cough*).—Hacking c. on inspiring air (brom., merc. prot.). Constant inclination to hack to relieve the tickling in larynx (brom.).

Characteristics and Concomitants.—*Dull frontal headache with coryza.

*Eyes burn, smart, itch; capillaries congested; and profuse bland lachrymation with coryza.

Noises in ears and dullness of hearing; jerking pain from throat to ear.

Dryness of, and bad odor from throat.

Throbbing, drawing, pressing pain in cheek, with swelling.

Sharp, thread-like pain in body and extremities.

Aggravation from northeast winds, and in warm room, > in open air.

CONIUM MACULATUM.

Acts upon the nerves supervising nutrition of the sundry tissues of the respiratory tract as elsewhere, acting advan-

tageously upon the different tumors both malignant and non-malignant. Fibroids of naso-pharynx and larynx have been reported cured when taken in early stages. They itch and prick on touch with burning, stinging pain and bloody, purulent discharge, accompanied with glandular deposit, and especially if of traumatic origin. Also of great service in a peculiar *nervous cough* caused by a dry spot in larynx, with crawling and suffocative attacks, *almost only on first lying down*, either day or night. Must sit up and cough it out, then it ceases (*Hys.*) Especially is this indicated if occurring in elderly people. Stomach cough, must hold chest and abdomen tightly. Asthma in old persons.

CUPRUM METALLICUM.

Rhinitis catarrhalis atrophica, impaired olfaction and taste. Sensation of rush of blood to head, pain in root of nose and supra-orbital region, especially the left, < by motion, the above indicating involvement of frontal sinuses. Its principal sphere is the neuroses of the larynx and pharynx, including croup, pertussis, laryngeal and pharyngeal spasms, and chorea of the same; croupous exudation on tonsil; *cough with interrupted, almost suppressed respiration*. Fatiguing cough with nose bleed; violent dry cough at night between the hours of eleven and one; < sitting, with tearing in head and return of anxiety and oppression in chest; hoarseness. In spasm of larynx is cyanosed face; panting, suffocative breathing; stiffness of body; *thumbs clenched*; attacks begin and cease suddenly (bell); > from drink of cold water (caust.).

EUPHRASIA.

A valuable remedy for coryza or acute nasal catarrh, *sneezing with profuse, fluent, bland nasal discharge, with excoriating lachrymation, red ulcerated lids, congested conjunctiva, burning in eyes*, also accompanied with cough and expectoration, < in A. M. It has the reputation of aborting coryza. It ameliorates attacks of hay fever, by controlling the profuse, excoriating lachrymation, and burning and

itching, which cause rubbing of eyes, swelling, and inflammation of lids. (For comparisons see *ars.* and *cepa*).

GELSEMIUM.

Nares.—(*Objective*).—*Redness and soreness of nostrils.

(*Subjective*).—*Premonitory symptoms of hay fever, *i. e.*, fullness in frontal region, dryness in nasal fossæ, mild nasal obstruction and pain in occipito-cervical region. *Anæsthesia and hyperæsthesia of mucous membrane. *Neuralgic pain.

(*Discharge*).—*Nasal catarrh with excoriating discharges, and sore throat associated with physical weakness (*ars. alb.*; *arum. tri.*, corrosive yellow discharge causing rawness of nostrils. *Cepa*=nasal discharge thin and excoriating, but the lachrymal is bland; *euph.*, the opposite of the latter). *Acute catarrh, *especially in summer*, with inflammation in throat and pain extending into ear with deafness (*bell.*, very similar to *gels.* in all its stages of acute catarrh).

Naso-Pharynx and Pharynx.—(*Objective*).—*Catarrhal sore throat.

(*Subjective*).—Dryness of mouth and throat, as after salt bacon, with disposition to frequent swallowing. Spasmodic sensation in gullet, with cramp-like pains. Paralysis of muscles of throat precluding swallowing (*Bell.*, *Merc. prot.*). [Note.—Farrington says “the inability to swallow in *gels.* is due to a paretic condition, while that of *bell.* is due to swelling, spasmodic contraction of fauces and hyperæsthesia of nerves.”] *Difficult swallowing from soreness and pain extending to ear.

**Post-diphtheritic paralysis* (*coculus*, *curare*, *con. mac.*, *phos. ether*, *zinc phosphide*), with feeling of lumps in throat. *Anæsthesia of mucous membrane of neurotic basis, *not* on account of atrophic changes. *Spasms of pharyngeal muscles.

Larynx and Trachea.—(*Objective*).—*Glottis spasmodically closed in children; **Paralysis* of glottis and muscles of vocal cords, with choking on swallowing, *especially of post-diphtheritic origin*.

(*Subjective.*)—*Voice weak. *Hoarseness or paralytic aphonia, with dryness and burning in throat < during menstruation, or caused by aggravating emotions (caust.). *Dyspnœa, with distressing fullness in chest, cold extremities, threatening suffocation.

* Long, crowing inspiration, followed by a sudden, forcible expiration.

Cough from tickling and dry toughness in fauces.

Characteristics and Concomitants.—Suitable to nervous, sensitive, excitable, or hysterical persons, also children; nervous systems, weakened by onanism or self-abuse; predisposed to taking cold from slightest change in weather.

Bad effects from great fright, fear, or grief.

Nervous headache, commencing in cervico-occipital region, spreading up over head; internal and external soreness of head; sensation of band about head; *fullness in head, with coryza; *pain in cervico-occipital region, with hay fever.

*Face hot with coryza; *profuse perspiration and darkly flushed face accompanying laryngeal spasm.

Dryness of mouth; numbness and trembling of tongue.

*Throbbing carotids, with coryza; pain in sternocleidomastoideus, back of parotid.

Frequent emission of clear, limpid urine seems to relieve the dullness and heaviness of head.

Excessive action of heart; fears that unless constantly on the move the heart will cease beating.

*Chilliness in back, with coryza; *feeling of languor and drowsiness, also accompanying coryza; *pain in all the muscles in first stage of influenza in neurotic persons; hands and feet cold; fatigue of lower limbs after slight exercise; complete relaxation of whole muscular system; weakness and trembling through whole body.

Prone to diarrhea from nervous excitement.

Fever, thirstless.

GRAPHITES.

The sphere of this drug is almost entirely in the nares and pharynx. It is in the vestibule of the former that its

most characteristic condition is found, *i. e.*, *Red, inflamed, scurfy, cracked, eczematous condition of mucous membrane. (Natr. mur.; vestibular eczema, with swelling of whole of upper lip. Nitr. ac.; = same with sticking, stinging pains); soreness in nose on blowing (Alum; Aur. met.; Sil.); ulcerative pain in nostrils; sneezing, with dryness of nose; obstructive catarrh, with nausea, headache, and languor. (Gels. = excoriated catarrh languor); anterior and posterior nasal discharge of offensive purulent mucus (Hepar.; Puls.) also blowing of bloody mucus (Carbo. an. and veg.); epistaxis at 10 P. M., after rush of blood to head and heat of face; hyperosmia, the perfume of flowers especially intolerable; sensation of lump in throat on swallowing, with either scraping or constrictive retching from esophagus to larynx; *chronic sore throat, with feeling of swollen gland or tonsil (Baryta c.); *chronic naso-pharyngeal catarrh, accompanied with frequent attacks of vestibular eczema; *chronic hoarseness in persons prone to herpetic eruptions, especially if occurring on suppression of such eruption; hoarseness, especially in evening (Caust.); tickling in larynx < in evening in bed, causing hawking and short cough; *spasmodic asthma, with suffocative paroxysms awakening from sleep, > by eating.

HAMAMELIS VIRGINICA.

This drug is curative where the blood vessels themselves are the seat of the disease, or in catarrhal or inflammatory affections where *the dilated condition of the small blood vessels is the principal indication*. *Profuse epistaxis, especially between 9 and 10 A. M., with tightness in bridge of nose and crowding pressure in forehead between eyes, and numbness over os frontis; *vicarious or idiopathic epistaxis (Bry.; Crocus.; Puls.; Sepia.); *dark venous passive hemorrhage; *hematoma; *tendency to nose-bleed; *chronic catarrh of the naso-pharynx, with congested fauces; varicose condition of blood-vessels (Natr. ars.; Phyto.; Puls.; Vespa.); tonsils swollen, with dryness and sensation of something lodged in throat; *paresthesia, with enlarged

blood vessels; *angioma of uvula has been reduced by it, and it is probably of benefit in similar conditions in larynx; *hypertrophy of lingual tonsils with greatly congested veins.

HEPAR SULPHURIS CALCAREA.

Nares.—(*Objective*).—*Redness and heat internally and externally, with swelling, idiopathic or when caused by corpora adventitia (Bell.; Acon.; Sulf.); scabs in nostril; *abscess; *empyema of antrum Highmori.

(*Subjective*).—*Pain in bones on touch. (Aur. met.; Merc. s.); *nares sore; *heat and soreness of bones, and sensitiveness to air or to touch in ozena (Graph.; Puls.; Kali iod.); *sneezing or tingling as soon as uncovered or from slightest draught.

(*Discharge*).—Coryza with inflamed swelling, which pains like a boil (Merc. c.); mucus from posterior nares mixed with blood; blowing of offensive mucus even without catarrh; *profuse greenish-yellow discharge; *ozena, *chronic diseases of nares resultant from abuse of mercury (Kali iod.); *purulent, stringy, even mixed with blood (Hydras. c.; Kali bi.; Merc. s.; Puls.); *catarrh caused by suppression of skin eruption.

(*Epistaxis*).—Bleeding from nose.

(*Olfaction*).—Hyperosmia (Gels.; Ign.); loss of smell (Gels.).

Naso-pharynx and Pharynx.—(*Objective*).—*Inflammation with splintering pain preceding tonsillitis suppurativa (Bell. = premonitory stage, first a phlegmonous inflammation, with fever and dryness, Baryta. c. = when above fever and dryness have subsided. Calcium sulphide = $\frac{1}{4}$ -grain capsule, four or six per diem when suppuration imminent, to hasten the same. Guaiacum θ = in gtt. v. doses four times per diem, and Merc. s.^l is said to stop the tendency to recurrent attacks of quinsy); *pharyngitis folliculosa with splintering pains and relaxed uvula (Nitr. ac.); *tonsillitis and anterior cervical glands hard and swollen; *phlegmonous and suppurative pharyngitis; *retro-pharyngeal abscess.

(*Subjective*).—Bitter taste in back of throat, with natural taste of food; **sticking as from splinter on swallowing, extending toward ear on yawning* (Apis.; Arg. nit.; Nitr. ac.); sticking extending to ear on turning head, suffocative constriction toward eve. (Lach.); smarting < by swallowing solids, with rawness and scraping; feeling as of a plug of mucus, or swelling at entrance; sensation of swallowing over a swelling (Phyto.; Ign.).

(*Discharge*).—*Chronic catarrhal discharge.

Larynx and Trachea.—(*Objective*).—*Congestion and inflammation from overuse (Arg. met.; Senega); *acute and subacute inflammation of larynx from exposure to cold winds, mostly in childhood; *follicular inflammation in larynx; *beneficial in lupoid inflammation; *ulceration and other inflammations as sequelæ of typhoid and typhus fever and small-pox; *traumatic inflammation of larynx (Acon.; Bell.; Sil.); *chronic tracheitis.

(*Subjective*).—Sticking beneath larynx after supper; weakness of organs of speech and of chest so she cannot speak aloud (Calc. c.; Caust.; Gels.; Phos.); *dyspnœa*; *hoarseness, aphonia, pain, and soreness from strain (Arg. met.; Rhus. t.; Senega); *larynx feels dry and sensitive to cold air (Act. rac.; Brom.; Hydras. mur.); *abscessus laryngis.

(*Discharge*).—*Considerable expectoration with subacute laryngitis; *cough, muco-purulent discharge and hoarseness accompanying follicular pharyngitis, < change of weather; *catarrhus laryngis from over use; *difficult expectoration of scanty, tenacious, muco-purulent material; *catarrh of larynx in tuberculous patients.

(*Cough*).—Cough < by deep breathing so as to cause vomiting; **paroxysmal cough if slightest part of body becomes cold, with sensitiveness of nervous system*; almost uninterrupted cough from tickling in left upper part of throat, < from talking and stooping until late in evening, when suddenly ceases; *in croup, suffocative cough. (Spong. = lying on back causes suffocation and cough. Samb. = the same < by lying with head low); suffocative

cough provoking vomiting; scraping rough cough; dry cough in evening; dry hacking after eating; **later stages of croup* with hoarseness, profuse collection of mucus, and difficult respiration, patient sweaty and weak (Acon. = first stage, fever, and dry skin. Brom. = little fever, cough of spasmodic character, and cyanotic tendency. Kali bi. = little fever, expectoration very tenacious); **dry*, harsh, croupy cough and hoarseness in subacute laryngitis.

Characteristics and Concomitants.—Indicated for bad effects of Mercury and Potassium iodide. Scrofulous diathesis. Very beneficial in sequelæ of scarlet fever.

Depression of spirits.

Pain in nasal eminence every morning.

Constant pressive pain in one-half of brain as from a plug or a nail.

Whizzing with loss of hearing; discharge of fetid pus from ear; scurfs on and behind ear.

Metallic and putrid taste; desire for acids, wine, and strongly flavored foods.

Swelling of upper lip; scurfy eruption on face with much pain; boils on lip and chin.

Sour eructations.

Abdomen distended; rumbling of flatus; stool soft, but passed with difficulty, clay-colored stools.

Acrid leucorrhœa; smarting vulva.

Prone to suppuration, boils, etc. Slightest injury causes suppuration or ulceration.

Sleepiness toward evening; fright during sleep; anxious dreams.

Offensive exhalations from the body; perspires easily on every, even slightest, occasion.

Aggravation from slightest exposure to cold. Ailments from, or soon after, west or northwest winds, which are improved by warmth.

HYDRASTIS CANADENSIS.

The active principles of this drug are hydrastin and hydrastia—it is the muriate of the latter which is most curative in diseases of the mucous membranes.

It is indicated in debilitated or old persons and scrofulous diathesis. *Gastric catarrh, constipation, and leucorrhœa*, are frequent concomitants. Acute nasal catarrh, the discharge is thin, watery and excoriating, inflaming nasal vestibule and upper lip. (Natr. mur.; Nitr. ac.) with sharp sore feeling in nares; catarrh of frontal sinuses. In chronic conditions, **discharge is thick, stringy, yellow or greenish and fetid; *frequently bloody; *ozena with ulceration and bloody discharge; *post-nasal dropping (Merc. prot.; puls.) with sensation of stuffiness in pharynx and nasopharynx; *nasal mucosa thickened while that of pharynx is atrophic and glazed; subjective dryness in nostrils, tickling like a hair; and a characteristic is sensitiveness of nares to inspired air, it feels much colder than really is; *in pharynx and larynx is a sore excoriated feeling; *especially indicated when disease proceeds to ulcerative stage and as a result have easily provoked bleeding; *epistaxis caused by slightest touch to nasal mucosa. Beneficial in scrofulous and lupoid ulcerations. Decidedly ameliorates symptoms accompanying carcinomata and sarcomata, especially in the degenerative stage.*

A STUDY IN LIGHT AND REFRACTION—V.

BY W. U. REYNOLDS, M. D., O. ET. A. CH., NEW YORK.

IN the last study it was found that when the cosine was the unit of the parts of an angle or circle, the tangent was equal to the $\sqrt{R^4 - R^2}$ and to $\sqrt{\text{Sec}^2 - \text{Sec}}$, and that when the radius was 5, *i. e.*, $5 \times$ the cosine, the tangent was equal to $\sqrt{600}$, and that when the 5 was divided by 10 making the radius .5, the tangent would be a very different number. It would be $\sqrt{.0625 - .25} = \sqrt{-.1875}$ or $T^2 = -.1875$.

According to mathematics this number is not capable of being reduced, since it is minus, and is the result of the multiplication of a minus and a plus factor, thus $(.25 - .5) \times (.25 + .5)$. However, leaving out the question of the sign and extracting the square root of .1875, there appears a striking similarity between it and the width of the lens based upon the focus of 600 parts, shown in Study III, page 213, and between it and the length of a ray of light as obtained by the parallax meter. Ray = 432, lens = 430, 8417 $\sqrt{.1875} = .43301$.

A peculiarity which may be accounted for perhaps by what is to follow.

Before going further, however, we may say that $\sqrt{+.1875}$ is the perpendicular to a side, or the apothem in a six equal-sided figure inscribed in a circle whose diameter is 1, *i. e.*, side = $R = .5$, apothem = $\sqrt{R^2 - (\frac{R}{2})^2} = \sqrt{.25 - .0625} = \sqrt{.1875}$. This value in this hexagon is the reverse of the formula for the value of any tangent of any circle measured in lengths of the cosine of the angle. Thus apothem = $\sqrt{.5^2 - .5^4}$ or $\sqrt{R^2 - R^4}$, any tangent = $\sqrt{R^4 - R^2}$. Now

taking the relationship of the width of the lens to this apothem, the lens is constructed upon a basis the direct reverse of any tangent of any circle of a radius greater than twice the length of principal focus.

It is at twice the focus of the lens that we get an equality of the object and picture, which distance, taken to equal unity, makes the focus equal to .5.

This formula for the tangent brings us back to the idea of the multiples of the lens, principal focus being the representations of powers of the principal focus and makes the distance of the object correspond to the square of the tangent of a circle, thus R^4 or 4 times p. f. minus R^2 or 2 times p. f. equals 2 times p. f. or double the focus of lens. $R^4 - R^2$ equals T^2 .

The end of the ray is in the periphery, of the circle of which the object is the center, and is twice as far off, a distance corresponding to the fourth power of the focus, the object distance corresponding to the square of the focus. The whole field of the lens, a spherical area, is presumed to be pictured upon it, and from thence to the screen also a spherical curve.

The area of a sphere is equal to that of four great circles, and the areas of circles are proportional to the squares of their radii or diameters, and similar segments must be in the same proportion.

The areas of spheres must then be in proportion to four times the squares of their radii, or its equal, the squares of their diameters ($4 R^2 = D^2$). Now both sides of the proportion containing the factor four, it can be left out, and we have the areas of spheres and similar segments proportional to the squares of the radii of the spheres, and to a quarter of the squares of the diameters.

Next the figure four has a peculiar property in that its square root is half of it, and any diameter of a circle measured in lengths of half a radius will be equal to the square of that radius, and consequently all spheres measured in terms of half a radius of a great circle, that is, all having as a unit of measure one quarter of a diameter, will have

their areas in proportion to the diameters, as well as to the squares of the diameters.

The area of a circle whose radius is two (2), *i. e.*, when measured in units of half the radius, is equal to the circumference. $\text{Area} = R^2 \times 3.14159 +$. $\text{Circumference} = D \times 3.14159$ (or $+ R^2 \times 3.14159 +$).

Therefore four times the circumference of a great circle is equal to the superficial area of a sphere when the diameter is four (4).

These principles are placed in action in the working of a lens; thus the diameter of light field semi-great circle is eight times the principal focus of lens; its radius is four times. The diameter of object field semi-great circle is four times the principal focus of lens; its radius is two times. In this way the diameter of light field sphere always equals four times the distance of object, the light field being composed of portions of the surfaces of spheres about the object, or parts of the object, as centers, and the distance of object being twice the principal focus when the picture is equal to the object. With a glass lens the lengths of radius of curve and of principal focus never change, but that of the focus for each distance of removal changes with every removal of object, in similarity to the sine of an angle ever varying its opening, its radius and its circle, but never changing its cosine. (The principle of a parabola). In this way comparisons are made with the diameters of the increasing circles anterior and the decreasing circles posterior to the lens, reducing them to a unit of the principal focus by dividing the measurements by the length of principal focus, which is one-half the length of focus when the object and picture are equal in size, and thus obtaining the relations of the sections of the areas of two spherical surfaces.

In connection with the cosine unit another peculiarity of the circle should be mentioned. It is that when measured in this unit the product of the segments of the diameter made by the foot of the sine ($R + C \times R - C$) always equals the secant minus one ($\text{Sec} - 1$), and also equals the

radius squared minus one ($R^2 - 1$), and also equals the sine squared (S^2), be the circle large or small, or the secant infinitely long or infinitely short. (See Fig. 11 central diagram). A comparison of secants and secants minus one, thus gives us a comparison of multiples and squares of several other parts of the circle and of areas plane and spherical.

In making our calculations of the focus we used only the distance to the radiant object, disregarding the distance beyond to the periphery of the light field circle, perhaps the same as in determining the refraction of the eye by skiascopy or retinoscopy with a plane mirror, where the light is on a line with patient's eye, and only the distance from mirror to the patient's eye is considered, yet at any time that mirror is only halfway between the source of light and the examined eye.

About the optical center we have the light field sphere, diameter 8, object field sphere, diameter 4, and a sphere diameter 2, within which the object and picture never go, and another of same diameter about principal focus which increases and decreases with movements of the object. These latter are to diameter of light field sphere as principal focus is to diameter of object field sphere, 1:4 or the 4th root, also to them (dia. 2) the diameter .5 of a sphere about optical center with radius .25 bears the same relation, 1:4 or its 4th root geometrically.

The latter diameter or double sine or common chord is thus the 4th root of the 4th root of the diameter of light field sphere or its 8th root. Its radius, .25, is the square of the diameter or the square of its own double, while it is its half or square root geometrically, and reverses the conditions outside the lens where diameters are the squares of their radii.

The square of this sine or radius arithmetically, .0625 or $\frac{1}{16}$ is the 4th power of its double or diameter .5, bearing the same relation to it that the principal focus, or 1, bears to the diameter of the light field sphere, $\frac{1}{16} : \frac{1}{2} :: 1 : 8$. Its square geometrically is its double or half the principal

focus. Its square root, or half, or 4th root, of the diameter bears the same relation to the principal focus (1) that 1 bears to the diameter of light field sphere, $\frac{1}{8} : 1 :: 1 : 8$. (Here $1^2 = 1$).

Thus the double sine or common chord is the 4th root of the sine ² arithmetically. Geometrically it is equal to the sine ², and to the 16th root of the diameter of the light field sphere, and the 8th root of the radius.

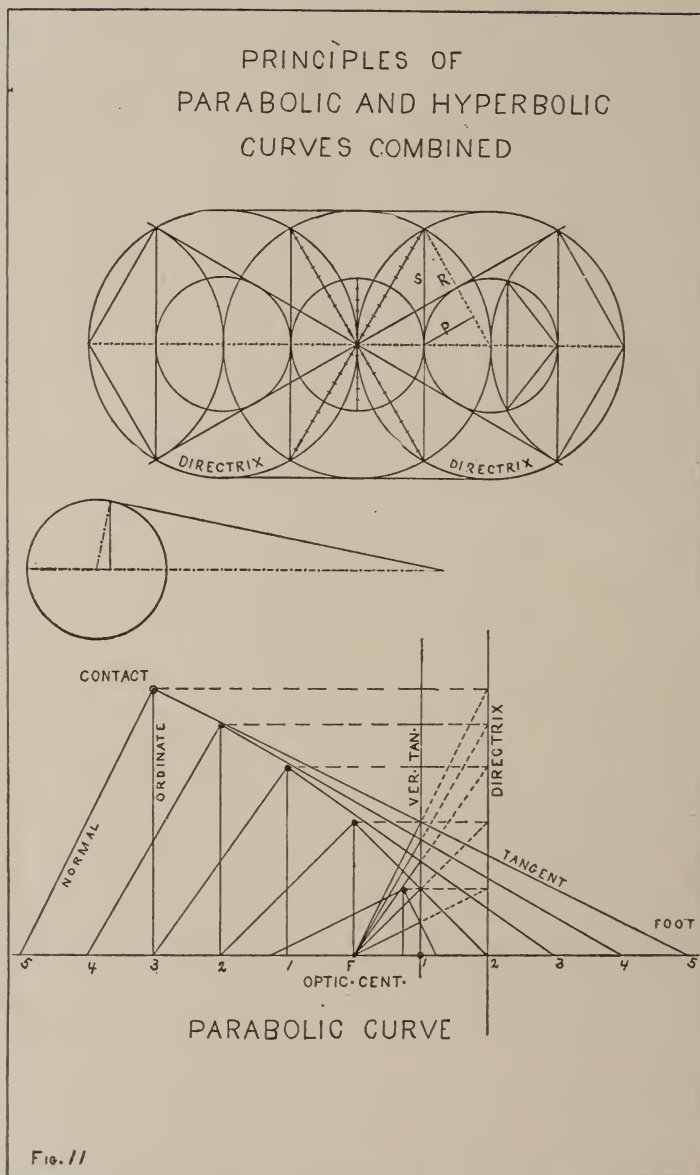
Of any angle the secant — 1 equals the sine ². Our calculations for length of focus are thus as if made with a sine ², but are only measured to the object, and consequently comprehend a smaller angle and half the distance of the light; the light would be represented by $(2 \times \text{secant}) - 2$ or $(2 \times \text{multiples of principal focus}) - 2$. A principle of the parabolic curve, its axis and ordinate.

In the lens a radius (1.0307+) to this sine (.25) is the square root of the radius of lens curve (1.0625), the 4th root of which is the cosine $\sqrt[4]{1}$ or the focus. The 4th root 1.0625 is 1.0152713+. Deducting unity leaves a very close approach to the square of the thickness of the lens or W^2 . (See page 213, Fig. 1, Study III), and to the square of .125 ($\frac{1}{8}$). Arithmetic and geometry disagreeing.

This measurement by an unchangeable cosine produces a principle the opposite of a hyperbolic curve in that for every multiple of the cosine put upon the radius, the difference between the lengths of the sine and radius as actual lines, while it is always equal to the $\sqrt[4]{1}$ arithmetically, varies in actual length with each multiple. See in Fig. 17 three or more lines, each a difference and each equal to $\sqrt[4]{1}$, yet no two of the same length. Arithmetic and geometry disagreeing.

The "parabolic curve" is such a curve that any point in it is equally distant from a point on the axis, called the focus, and a line at right angles with the axis, the directrix, the lines connecting the distances forming the square sides of an isosceles triangle.

The "hyperbolic curve," is such that any point in it is equally distant from a point on the axis, the focus, and



from the periphery of a circle about another point on the axis outside the curve, the second focus. The radius of the circle is equal to the "transverse axis," or distance between the apex or vertex of the curve and the same part of another curve about the second focus.

The difference between the distances is consequently always equal to the transverse axis.

The differences from each point being equal, form the two equal sides of an isosceles triangle whose base is the distance from the focus to the point on circular directrix.

The line P, the part of the circle spoken of in previous study, gives at once the main parts of either curve when expressed as a common fraction with the square of the sine as a numerator and the square of the radius as a denominator. P never equals unity; its basis is the cosine which is unity.

Fig. 11 shows the main principles of the two curves. The parabolic has six points in the curve worked out. There is one point in the curve of which the distances are equal in all directions, forming an equilateral triangle and center of a hexagon in a circle, at the same time the focus is the center of a regular hexagon. This point corresponds to axis 8.

Every point in the curve is the center of a circle tangent to the directrix and passing through the focus. The vertical tangent passes through the apex and is limited for each point of the curve by the tangent, which it bisects. It, (V. T.), is parallel to the directrix and bisects the distance between focus and directrix, cutting the axis into two unequal parts whose difference is always the distance from apex to focus or always 1.

The line from focus to center of tangent is perpendicular to it and is the radius of a circle of which the vertical tangent is the sine and the distance from apex to focus the cosine.

The line P is not shown, but one expression of its value is $\sqrt{\frac{R^2-1}{R^2}}$. The numerator multiplied by denominator gives us the square of half the tangent. The denominator is half the axis. This same formation can be applied to

the line perpendicular to tangent at its point of contact, the normal, but the cosine or unit of measure will be doubled. Every geometrical combination appears to have its own unit to which alone it is harmonious.

It can be shown that these parabolic tangents and axes are chords and diameters of two intersecting circles with centers at the focus and center of tangent. With complete curves there are four intersecting circles. Parallel axes, and two complete curves, comprehend eight intersecting circles. The primary principle is an angle inscribed in a semicircle which *will always* have one of its angles a right-angle.

Four times the line R, or the square root of sixteen times its square, will be the diameter of a circle which, with center at the focus, will have the tangent as a chord and the axis as a diameter.

In the upper diagram, in Fig. 11, are the main parts of a hyperbolic curve, but no point of the curve is indicated. The two directing circles with centers at the foci at the right and left. The center of large circles in center, is the "center of the curve," the periphery of this passes through the foci. The radius of a directing circle equals the transverse axis or distance between the apices of the unseen companion hyperbolic curves and is shown as the diameter of the small central circle. Vertical tangents limited by the circle through foci equal the "conjugate axis," and lines connecting their extremities are the "asymptotes."

It will be at once evident that the difference of the squares of an asymptote and transverse axis equals the square of the conjugate diameter.

About each focus is a small circle of same diameter as that on the center and tangent to it. These two small circles in connection with the adjoining chords of the large circles (solid lines) make up the parts of two parabolic curves, forming a combination of the principles of the two "conical" curves, the hyperbolic and parabolic curves being known as "conic sections."

The smaller the cosine of foundation circle, the unit, the more acute will be the two conical curves. The more nearly the transverse axis equals the distances between foci the more acute will be the hyperbolic curve. With distant foci and short transverse axis the hyperbolic becomes very flat or obtuse. There can thus be innumerable hyperbolic as well as parabolic curves of all varieties of acuteness, depending on the length of the unit of measure.

When the hyperbola and double parabola are based, as in this, upon an axis of eight parts, and these parts are each divided into six smaller parts, making forty-eight for the double axis, the value of an asymptote will be 24 or $\sqrt{576}$, and that of the transverse axis will be $\sqrt{144}$, and that of the chord through apex (double vertical tangent), which equals the conjugate axis will be $\sqrt{432}$, or the fourth root of light.

The asymptotes are the hypotenuse of a right-angled triangle of which the conjugate axis equals one leg and the transverse axis the other leg. Either leg may be the longer according to the sharpness of the conical curve.

In the figure in a total length of eight, the distance between foci is four, the distance between the apices is two, the foci corresponding to object and image made by a lens, or the whole to the diameter of the light field circle about the optical center of a lens.

The line P in the curve equals $\frac{\sqrt{3}}{\sqrt{4}}$ The $\sqrt{3 \times 4} = \sqrt{12}$, which is the distance from the end of R to the other focus, The $\sqrt{12} \times 6$, to reduce to units of $\frac{1}{6}$, equals $\sqrt{432}$ or $\sqrt[4]{\text{Light}}$ and is the side of an equilateral triangle contained in the circle through foci.

A perpendicular to the axis from the point of meeting of P and R would make the basis of a new system with $\frac{1\frac{1}{2}}{6}$ or .25 = C, $\frac{3}{6}$ or 5 = R and $\sqrt{.1875}$ = S. A very close approach to the values of the lens already studied.

Fig. 12 shows a portion of a parabolic curve more elaborated and containing part of the lens principles.

PARABOLIC CURVE.

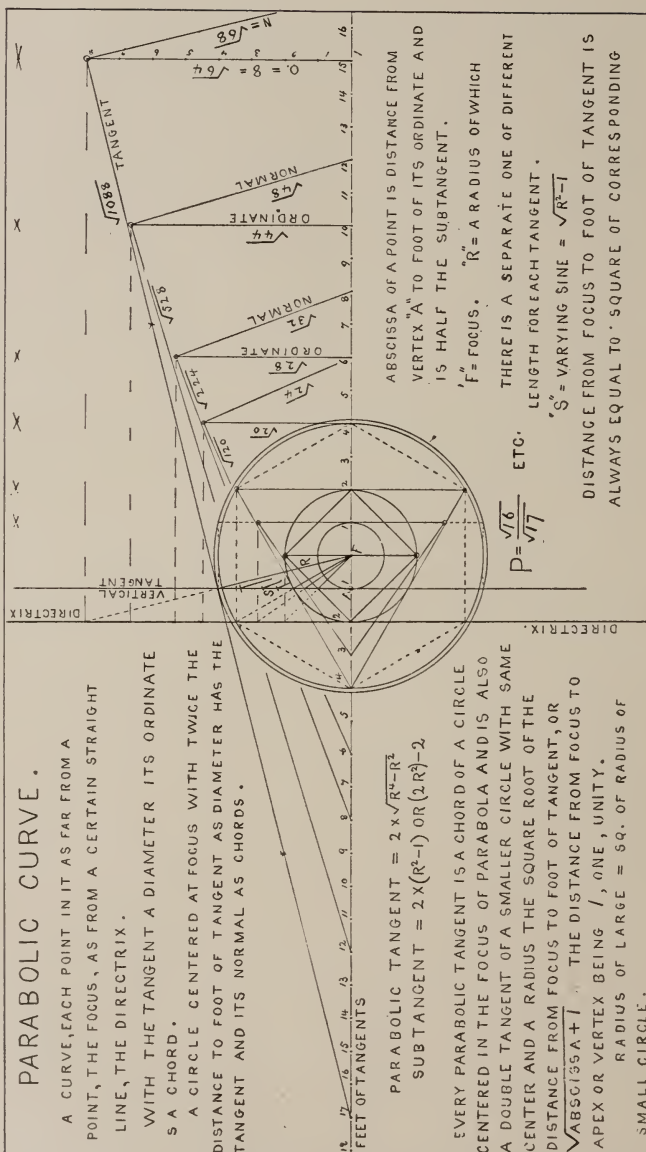
A CURVE, EACH POINT IN IT AS FAR FROM A POINT, THE FOCUS, AS FROM A CERTAIN STRAIGHT LINE, THE DIRECTRIX.

WITH THE TANGENT A DIAMETER ITS ORDNATE IS A CHORD.
A CIRCLE CENTERED AT FOCUS WITH TWICE THE DISTANCE TO FOOT OF TANGENT AS DIAMETER HAS THE TANGENT AND ITS NORMAL AS CHORDS.

$$\begin{aligned}\text{PARABOLIC TANGENT} &= 2x\sqrt{R^2 - R^2} \\ \text{SUBTANGENT} &= 2x(R^2 - 1) \text{ OR } (2R^2) - 2\end{aligned}$$

EVERY PARABOLIC TANGENT IS A CHORD OF A CIRCLE CENTERED IN THE FOCUS OF PARABOLA AND IS ALSO A DOUBLE TANGENT OF A SMALLER CIRCLE WITH SAME CENTER AND A RADIUS THE SQUARE ROOT OF THE DISTANCE FROM FOCUS TO FOOT OF TANGENT, OR $\sqrt{ABSCISSA + 1}$. THE DISTANCE FROM FOCUS TO APEX OR VERTEX BEING 1, ONE, UNITY.

RADIUS OF LARGE = SQ. OF RADIUS OF SMALL CIRCLE.



ABSCISSA OF A POINT IS DISTANCE FROM VERTEX "A" TO FOOT OF ITS ORDNATE AND IS HALF THE SUBTANGENT.

F = FOCUS. R = A RADIUS OF WHICH

THERE IS A SEPARATE ONE OF DIFFERENT LENGTH FOR EACH TANGENT.

$$S = \text{VARYING SINE} = \sqrt{R^2 - 1}$$

DISTANCE FROM FOCUS TO FOOT OF TANGENT IS ALWAYS EQUAL TO SQUARE OF CORRESPONDING

$$P = \frac{\sqrt{16}}{\sqrt{17}} \text{ ETC.}$$

Fig. 12

The R is the square root of the radius of lens curve, the distance from apex to focus is one-quarter the principal focus. The tangent of axis 8 is shown as the side of an equilateral triangle contained in a circle, while twice its R, or 4, is the radius of the circle and contained in it six times, forming a hexagon.

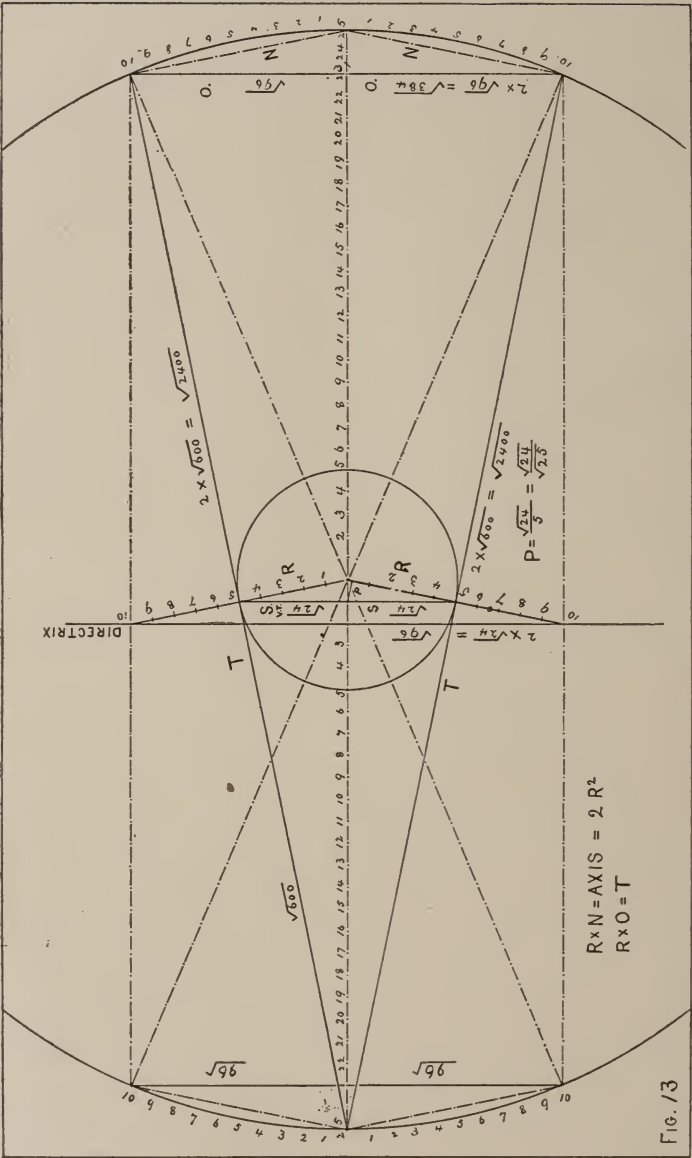
The P belonging to each point is equal to the square root of half the axis less two, divided by half the axis. From it all the other parts connected with each point in the curve can be evolved.

The parts $R+1$ and $R=1$ into which the diameter of the inner circle is divided by the foot of the sine or vertical tangent, when multiplied together, equal the secant minus 1, and this when doubled equals the axis minus 2, and this is equal to the square of half the chord formed by the double sine or double parabolic vertical tangent. The square of the diameter of the inner circle multiplied by the square of the double sine or vertical tangent equals four times the square of the parabolic tangent. The square of the double vertical tangent (or the double sine or chord) multiplied by the R^2 equals the square of the parabolic tangent. All the parts of the parabola are obtainable from the parts of the small inner circle, and these form the line P.

The points in the curve are designated by little circles about the junction of ordinate and tangent. The longest tangent represented has its foot at 17 from the focus, is 8 times its R, and its ordinate is 8 times the distance from apex to focus.

Fig. 13 contains one point and its parts of a parabola based on a unit of $\frac{1}{6}$ the focus with a radius of 5. The numerical values are remarkable when taken in comparison with others, those on Fig. 10 for example. Also especially is the value of the tangent. If one be added to 2400, making 2401, there is formed the fourth power of 7, the square root of 2401 being 49. All these large numbers are evolved from the single unit, the distance from apex to focus.

It is now very evident that when the measure of the sunlight was taken with the parallax meter there were obtained

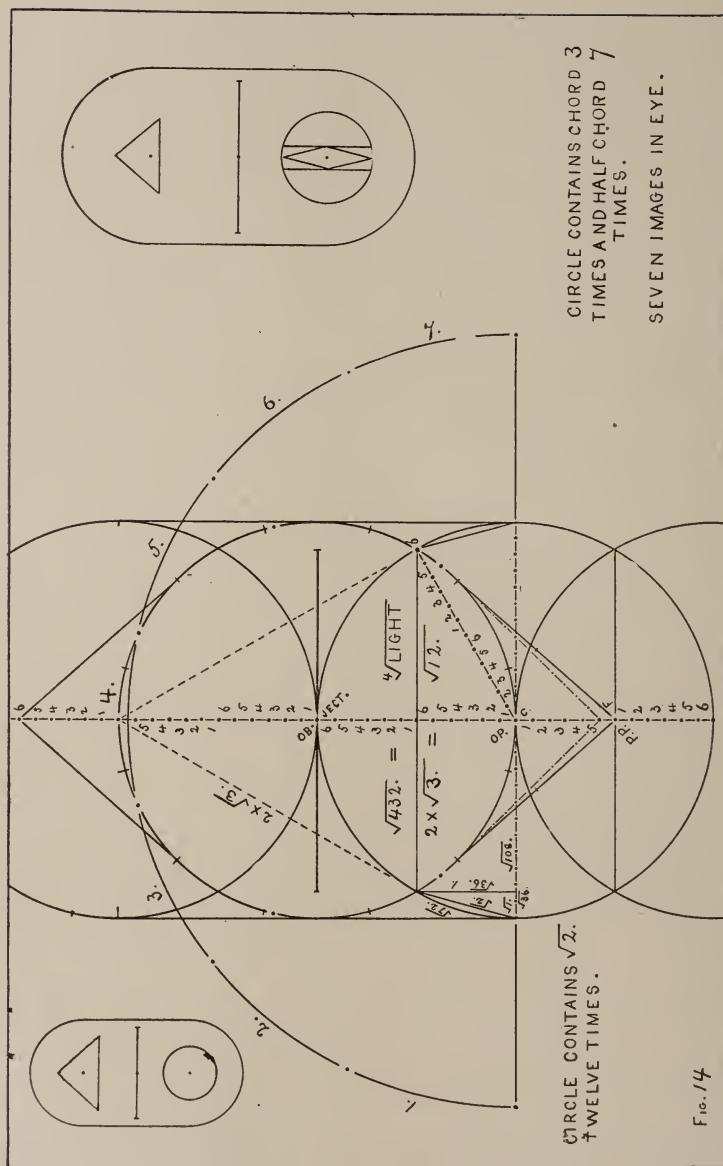


the principal parts of a parabolic curve and that the lens measurements correspond to it. Thus the measure of the disk of sunlight was 185 to 186; the square of the lens diameter (Fig. 1) or L^2 is 185,625. In Fig. 10 the difference between Sec^2 and R^2 is 4,320,000, or the proportionate length for a ray of light 10,000 in diameter.

When looking through a minute opening at a small flame, seven images of the flame will be seen when the flame is at a certain distance. The same phenomenon appears on looking through a small glass rod, across the length. These seven images multiply when the distance is increased and the row of images is like a picket fence with some or certain of the intervals larger or wider than others, making the spaces between images of irregular widths. Two crossed glass rods produce a small patch of light which, upon careful examination, is found to be made up of a multitude of minute images of the flame.

If, as in Fig. 14, we intersect two circles, the center of each on the periphery of the other, and divide the radii into twelve parts, representing two foci divided into six parts each, the sides of the equilateral triangle we may form by connecting the intersections will be equal, when measured in the units made by the division of the radii, to the $\sqrt[4]{432}$ or the $\sqrt[4]{\text{Light}}$. One-half a side is contained in the circle seven times, a whole side three times. If we make one side a chord and the opposite point of the periphery a center, we can describe a semicircle representing the field, and this will contain the same line seven times. Can this be connected in any way with the seven images. Does each image represent the $\frac{\sqrt[4]{\text{Light}}}{2}$? It is very evident we have here the principles of a parabolic curve.

The radius of the primary circle is contained six times in its own circle, and if we can bisect the arcs we will have a division of the periphery into twelve parts. The chord of one of these parts equals $\sqrt[4]{72} = \frac{1}{\sqrt{6}} \times \sqrt[4]{432}$. Include



three of the divisions by a chord, and the chord will be the side of a square inscribed in the circle.

A line connecting a corner of the square with the middle point of the radius of the intersecting circle will be equal to double the radius of curve of the lens, or to 12.75. This line is not tangent. A tangent would be twelve and have its foot at one division nearer the periphery of the circle.

If now we take the chord $\sqrt{432}$ as a radius and the extremities of the diameter as centers and intersect two circles within the primary circle, a line connecting the intersections will equal the line $\sqrt{432}$.

This figure is supposed to represent the scale or rule used by ancient workmen; in fact, it is understood to be in use at the present day by makers of designs modified for the ready division of circles. It contains the divisions of the carpenters' square, viz., 24 and 12.

In the upper left hand corner is a small diagram containing all but the minor dimensions; the longest dimension is 48 of the minor, the width is the diameter of four lens foci or 24, and half of it is contained six times in the circle. The line in center is $\sqrt{432}$; half of it is contained seven times in the circle. The base of the triangle is contained four times in the circle, its side is the diameter of the lens curve. The radius of the small circle is the focus and its double is contained six times.

The carpenters' square and the inch are of great antiquity and founded on the light of the sun and action of an eye.

MATERIA MEDICA AND THERAPEUTICS OF THE EYE.

BY C. C. BOYLE, M. D., NEW YORK.

CLEMATIS.—Eyes red, glittering, hot and dry. Inflammation of whites of eyes with lachrymation. Burning as if fire streamed out of them. Biting, burning pain. Sensitive to air. Dryness and heat compelling him to close the lids. Sensation as of a veil before the eyes. Lachrymation. Pupils contracted. Pain in middle of left eyeball. Pressure in orbits on moving eyes. Vision indistinct.

Clinical.—This is a remedy I have not used often, but from the richness of its symptoms it should be a valuable one in certain inflammatory affections. Its symptoms resemble *Sulph.* and probably would act as well if not better than that remedy in certain cases in which the latter is prescribed. It has been recommended for iritis, especially if there is posterior synechia; also in ulceration of the cornea with burning, tingling, and stitching pains, with sensitiveness of the eyes to heat and bathing. In chronic irritable condition of lid, with swelling of meibomian glands in young and scrofulous subjects it deserves a trial.

COCCULUS.—Bruised pain at night, with inability to open lids, dim vision. Objects seem to move up and down; dark spots before the eye. Pressive pain in forehead from without inwards with nausea, < by reading; headache as if something forcible closed the eyes, or as if eye were being torn out.

Clinical.—A case of rheumatic glaucoma with severe pain in and around eyes is reported cured by this drug, as is also a case of kerato-iritis in a rheumatic subject.

COLCHICUM.—Painful, rending, tearing, drawing pains, in left side of head, from eyeball to occiput. Violent, sharp, tearing pain in and around left eyeball.

Clinical.—A case of glaucoma with drawing, digging pain, deep in the orbit, is reported relieved by the drug. It has also been administered with marked success in cases of rheumatic iritis with great soreness of eyeballs.

COLOCYNTHIS.—Severe burning, sticking, and cutting extending around the eye and up into the head; sensation on stooping, as if eyes would fall out, violent, shooting pain in forehead and eyes from without inward, which gradually decreases only to return with increasing severity. Intense pain through the whole head, < by moving the eyes. Painfulness of whole head and eyes, < by bending forward. Smarting in the eye, especially in outer canthus, with lachrymation, feeling as if canthus were glued up. Sharp, cutting, stabbing pains from knives, in right eyeball. Cutting, or burning pains in eyes, with much acrid discharge. Painful pressure in eyeballs, especially on stooping. Severe, cutting, stitch-like ciliary neuralgia, > by firm pressure and while walking in a warm room, < by rest at night and when stooping.

Clinical.—A case of glaucoma in which the eyes were inflamed, pupil dilated and immobile, the aqueous turbid, eyeball tense, hot, and protruding, copious lachrymation at night, agonizing, tearing, throbbing, and burning pains, with great photophobia, is reported cured by this remedy. It is indicated in neuralgic affections of the face, eyes, and head, also, bad effects from anger.

COMOCLADIA.—Eyes feel very heavy and larger than usual; painful, and feel as if they were pressing out of the head; as if something were pressing on top of eyeballs, moving them downward and outward. Intermittent pain from posterior part of eyeballs through head, below occipital protuberance. Right eye very painful, feeling much larger and more protruded than the left.

Clinical.—I have prescribed it in asthenopia, where the patient complained of sensation as if the eye were being pushed out. It is indicated in ciliary neuralgia and chronic iritis.

CONDURANGO.—This remedy is indicated in eye affections occurring in patients with sores, or cracking of corners of the mouth; also in cancerous affections.

Clinical.—A case of a flat epithelial cancer of the lower eyelid is reported cured by the drug; also, a case of superficial ulceration of the cornea with redness, photophobia and pain, in which the patient had cracking of the corners of the mouth.

CONIUM.—Sensation as if something like a fringe were falling over the eyes. Cannot read long without the letters running together; cannot bear either light or heat. Difficulty in raising eyelids, they seemed pressed down by a heavy weight.

Clinical.—It has been used in various eye troubles where the photophobia was marked, as hyperesthesia of the retina, and the different forms of keratitis accompanied by great photophobia. I have found it useful in asthenopic troubles in which there was difficulty in reading, the eyelids felt heavy, accompanied by more or less photophobia. It has been reported as retarding the growth of cataracts.

CROCUS SAT.—Sore burning in the eyes after reading awhile; also dimness, must wink frequently. Pain in eye extending to top of head; pain in left eye darting to the right; sensation as of cold wind blowing across eye (*Berb. vulg., Fluor. ac., Medor., Thuja*). Feeling in eyes as if one had been weeping violently, as if water were constantly coming into the eyes. Constant winking, with tearful suffusion of the eyes. Frequent necessity to wink and wipe the eyes, as of a film of mucus were over them (*Alumina, Euph., Puls.*). Inclination to press eyelids closely together from time to time.

Clinical.—I have found this an excellent remedy in asthenopic trouble with the above indications.

CROTALUS HOR.—Tearing, cutting pain as if a cut had

been made around the eye, < morning and evening; great sensitiveness to light. Pressure above the eyes. Very severe pain in right eye and top of head, extending down right side to the back of the neck, aggravation of eye symptoms at menstrual period.

Clinical.—It is used in hemorrhagic affections of the eyes, especially of the retina, either idiopathic or accompanying Brights' disease or syphilis.

CROTON TIG.—Copious lachrymation. Ciliary injection, with considerable pain in and around the eye, usually worse at night. Burning pain in inflamed eye. Tensive pain above the right orbit. Pain extending from pupil of left eye to back of head. Sensation of a string pulling eyeball back into head (*Paris quad.*) Soreness of eyeballs when turning eyes (*Bry., Spig.*) Œdematous swelling of lids.

Clinical.—This is an excellent remedy in pustular inflammation of the eyes, especially if accompanied by a pustular eruption on the lids and face. I have repeatedly prescribed this remedy for these conditions with signal success.

CUPRUM ACET.—Double vision; paralysis of left external rectus.

CUPRUM MET.—Pressing pain in eyes. Convulsive and restless movement of the eyeball; frequent twitching of the lids; violent pain in forehead, worse over the left eye; sensation of pressure over left eye.

Clinical.—I have derived benefit from its use in paresis of the superior rectus. It has been used in blepharospasm and in convulsive movements of the eyeballs.

CYCLAMEN.—Dimness of vision with spots before the eyes, especially on awaking; dim vision with headache. Dimness of sight, with fiery spark before the eyes. Flicking before the eyes as of various colors; glittering needles, fiery specks and sparks. Vision of smoke and fog; halo around the light. Vision of colors.

Clinical.—It is indicated in visual disturbances, particularly if associated with indigestion and disturbance of the menstrual functions. I have prescribed it in several of these cases with beneficial results. It is said to be a good

remedy where there is diplopia due to convergent strabismus from helminthiasis.

DUBOISIN.—Optic disk very red, small vessels of the disk visible, larger vessels enlarged and tortuous; outline of disk indistinct; retinal veins dilated, arteries diminished; whole fundus hyperæmic. Paralysis of the ciliary muscle. Aching over the eyes, in forehead and temples, with vertigo. Frontal headache; sharp pain through upper part of eyeballs from front to back, worse by artificial light; eyes feel hot and dry; conjunctiva hot and dry.

Clinical.—I used this remedy in a case of neuro-retinitis, where the veins of the optic nerve were enlarged and tortuous, arteries smaller, outlines of disk of both eyes hazy, intellect dull, and memory poor. There was also partial deafness. Vision $\frac{2}{5}$. The symptoms I considered due to a mild form of meningitis from some cause unknown. Under the duboisin the patient made complete recovery, with entire disappearance of above symptoms and restoration of vision. Lately, I used it in a case where vision had become poor ($\frac{2}{7}$) suddenly, without any apparent cause. The ophthalmoscope showed a congestion of the optic disk, but hardly a neuritis. The veins were enlarged and arteries about normal. The pupils were dilated. There was nothing to account for this condition as far as I could learn. The vision was restored in about a week's time by duboisin 6x.

DULCAMARA.—Inflammation of the eyes. Pressure in eyes; < reading. Feeling as if they would be pressed out of the orbits. Dilated and contracted pupils, alternately dim sight; sensation as if fire were darting out of the eyes; < when walking; sees as through a gauze; aggravation of symptoms in damp weather; amelioration from warmth and dry weather.

Clinical.—A case of idiopathic iritis occurring after exposure in damp weather; > at night and in cold air; > during motion and from warmth, is reported as cured by the drug. Useful in scrofulous ophthalmia; < from exposure to cold, also in scrofulous blepharitis and adenitis, accom-

panied by crusty eruption on margin of lids; and swelling and induration of cervical glands.

ERYNGIUM AQ.—Purulent inflammation of the eyes; eyes congested, red and swollen, with profuse purulent discharge. Smarting and burning from a strong light, with heavy pain, dull expression of the eyes and sleepiness. Stiffness of the muscles, with pain on turning them.

Clinical.—I have prescribed it with success in purulent conjunctivitis, when the eyes were congested, accompanied by a purulent discharge, and also in a case of ophthalmia neonatorum and one of granular conjunctivitis.

EUPATORIUM PERF.—Painful soreness of the eyeballs. Redness of margin of lids, with glutinous secretion from the meibomian glands. Biting at times; biting water runs from them; frequent burning and biting, obliging one to wink; < at noon; > by increased lachrymation.

Clinical.—It is a remedy we would prescribe where there was soreness of the eyeball, especially in malarial or bilious patients, or in la grippe or other catarrhal fevers.

EUPHRASIA.—Eyes very sensitive to light; vision somewhat dim as through a veil. Burning in eyes with lachrymation. Frequent burning biting in the eyes, necessitating frequent winking; acrid water runs from them; sensation as if a hair hung over the eyes and must be wiped away. Feeling as though cornea was covered with much mucus (*croc., puls.*); it obscures vision and obliges him to frequently close and press lids together; lids swollen and red. Streaming of hot, burning tears from the eyes, with great photophobia; profuse running from nose without burning.

Clinical.—It has been used in almost all the external diseases of the eyes, but its special sphere is in the catarrhal troubles of the conjunctiva, accompanied by acrid discharge and lachrymation; excoriating lids and cheeks; burning and biting in eye; non-excoriating coryza; mucus obscures vision by covering the cornea; > by winking.

FERRUM MET.—Pressure in the eyes as if they would protrude; < in right eye.

Sticking pain over the left eye coming very suddenly and lasting a short time.

Inflammation of eyes. Redness and swelling of the lids: styes on upper lid.

Clinical.—It has been prescribed successfully in morbus basedowii after suppression of menses; protruding eyes enlarged thyroid; palpitation of heart; excessive nervousness. I have used it in styes of the upper lids.

FERRUM PHOS.—Smarting in edges of right lids, neuralgia in left inner half of brow and down left side of nose, in evening when riding. Sharp aching at outer edge of left orbit as if in bone.

On stooping cannot see; seems as if all blood ran into the eyes.

Clinical.—It is used in acute conjunctivitis without supuration; marked redness of the eyes, with pain.

Conjunctivitis with photophobia during measles.

FLUORICUM ACIDUM.—Lids feel as if forced open and as if cool wind was blowing in eyes, then sensation like sand in eyeballs, which feel inflamed.

Feeling as if he must wink, as if something were in the eye that could be rubbed out.

Pleasant sensation as though the eye lids were opened wider or eyes more prominent.

Clinical.—It has cured lachrymal fistula, and I myself have used it with benefit in this class of cases.

I have prescribed it in asthenopic troubles of the eye where patients complained of the sensation of cold wind blowing under lids.

GELSEMIUM.—Heaviness of the eyes. Drooping of lids, < in left, > closing them. Lids closed in spite of him on looking steadily at anything, partially closed and motionless; half closed and apparent inability to move them. Difficult to open lids or keep them open; smoky vision with pain above eyes; with vertigo, > by profuse watery micturition.

Sees double, when inclining head toward shoulder or looking sideways.

Double vision, paralysis of oculi-motor and abducens.

Blindness with dilated pupil.

Paralysis of accommodation.

Amaurosis from masturbation; and body prostrated.

Cloud over outer half of field of vision. Increased tension.

Hazy vitreous.

Clinical.—It has cured serous choroiditis and irido-choroiditis where the vision was dim, pupil dilated and vitreous cloudy. I have used it in these cases with marked success. I have cured two or three cases of detachment of retina due to myopia with this drug. In paralysis of accommodation following diphtheria I have found benefit from its use; in paresis of any of the ocular muscles it is to be thought of, especially in ptosis.

ABSTRACTS FROM CURRENT LITERATURE.

Sauvineau (Paris).—A New Type of Associated Paralysis of the Horizontal Movements of the Eye.—*Rev. Gen. d'Ophthal.*, No. 7, 1895.

Previous to the past few years, all the paralyses of the eye have been classified under the old order as paralysis of the third, fourth, and sixth pairs of cranial nerves, while most of the cases that are difficult of interpretation are called ophthalmoplegias. Nevertheless, there is a class of cases in which there is neither isolated paralysis of the third pair of cranial nerves nor ophthalmoplegia. These cases are associate or conjugate paralyses, attacking the muscles that produce the same movement in both eyes at the same time, and, it is the character of these movements that must be considered, not the paralysis of this or that muscle looked at individually. A muscle may be paralyzed for certain movements and still retain its power in others.

Among these movements (horizontal, vertical, of convergence and divergence) the horizontal and lateral are the most interesting to study, for their explanation would remove a difficulty that has long occupied the attention of physiologists, viz., that of association or the same motion occurring in two muscles (the internal rectus of one side and the external rectus of the other) stimulated by different nerves.

There is another variety of this paralysis of horizontal, lateral motion, of which two types have been described. The first was noted by Foville in 1858, and, in greater detail, by Féréol and Groux. These authors have shown that a lesion of the *eminentia teres* (the point of origin of the sixth pair of cranial nerves) produces a paralysis of the external rectus of the corresponding side and of the internal rectus of the opposite side. An explanation of this fact has been given by MM. Duval and Labarde, who

have proven that, at the origin of the sixth pair of nerves, there is given off a nerve filament destined to associate the internal rectus with the external rectus of the opposite side, while, for convergence, the internal rectus receives special innervation coming from the origin of the third pair of cranial nerves.

The second type has been described by M. Parinaud, and consists of a paralysis of the external rectus of one eye, while the internal rectus of the other eye not only is not paralyzed, but, on the contrary, is in a state of more or less pronounced spasm. In this case the lesion is below the origin of the sixth pair, upon the course of the external motor oculi.

I have observed a third type, plainly marked, which is precisely the reverse of preceding. The internal rectus of one eye is paralyzed (in lateral movement only, convergence remaining intact), while the external rectus of the other eye is the seat of spasmodic phenomena. The lesion here seems located in the protuberance, upon the course of the anastomosing filament going from the origin of the sixth pair to the internal rectus of the opposite side.

DEADY.

Baas, H. L.—Hepatic Ophthalmia ; with Contributions to our Information upon Conjunctival Zerosis and upon the Pathology of Affections of the Ocular Muscles.—*A. von Graefe's Archiv*, xl. 5, 1894.

Two cases of ophthalmia are especially noted in the course of a cirrhosis of the liver, occurring in young persons aged respectively twenty and seventeen years. Subjectively, there was hemeralopia and a slight diminution of visual acuteness, without contraction of the visual field. Sensitiveness to light was slightly diminished. Objectively, there was a zerosis of the conjunctiva, and, with the ophthalmoscope, there was some waxy degeneration of the papilla, hyperæmia of the retinal veins, a very fine granular disorder of the retina, with small punctiform white foci in this membrane, a mottled appearance of the pigment layer, and a posterior polar cataract. These symptoms varied according to the icteric condition, and this the writer believes to be indicative of a connection between the affection of the liver and that of the eye.

In the first case the ocular trouble improved along with the general condition and the patient was lost sight of. The second case died of the cirrhosis and the author was able to get an eye for microscopic examination. It then appeared that the choroid

was the principal seat of the degenerative changes. There was a diffuse endarteritis and endophlebitis, and atrophy of the parenchyma with a new formation of connective tissue like a cirrhosis of the choroid. Here and there were foci of round cells. All of these changes reached their greatest height at and about the ciliary body. It must therefore be assumed that they developed from before backward. The pigment epithelium presented very pronounced atrophic changes. The papilla was the seat of œdematous infiltration. There was also endovasculitis of the retina, less, it is true, than that found in the choroid, œdematous in character and localized especially in the reticular layer.

Concerning the xerosis, M. Baas has been able only to verify the facts already established by other authors, showing the fatty degeneration of the epithelial cells and the presence of the bacillus of xerosis. A microscopical examination of the pieces of muscular tissue adhering to the globe of the eye also showed traces of chronic indurative inflammation with partial atrophy of the muscular fibers.

Since this form of ophthalmia is analagous to that of albuminuria, the author proposes to call it "ophthalmia hepatica" or, better still, "ophthalmia icterica," the retention in the blood of all the biliary products being, undoubtedly, the cause of these troubles.

DEADY.

Nichols, Dr. J. E. H.—An Analysis of 824 Ear Cases in the Year 1894.—*Manhattan Eye and Ear Hospital Reports*, January, 1895.

The writer of this article presents a large amount of interesting data, only a small portion of which can receive brief mention.

The routine treatment for both the diffuse and circumscribed forms of inflammation of the external ear consisted of daily cleansing of the canal with hydrogen dioxide, hot douching, and "mopping," after which it was packed with cotton saturated with boro-glyceride U. S. P. The reported cures are eighty-six per cent., with an average duration of four days, the swelling and pain having subsided in that length of time.

Twelve cases of myringitis are reported, two of which were traumatic in origin and one of these developed successively an acute suppuration of the middle ear and acute mastoiditis, but recovered without operative interference. The treatment in these cases consisted of instillations of a solution composed of

four per cent. cocaine and eight per cent. resorcin every hour or two. Seven cures are reported, the average duration of the affection being one week. Of eight cases of acute catarrh of the middle ear, in which the area of inflammation seemed to be confined to Shrapnell's membrane alone, nine were cured by means of the cocaine and resorcin solution, no other treatment being used; one was treated with a ten per cent. solution of carbolic acid in glycerin, while two needed nothing further than gentle inflation. One case went on to suppurative inflammation. The remaining six cases are not reported. Tinnitus was present in nine cases.

Sixty-four cases of acute catarrh of the middle ear are reported, of which sixty-four per cent were cured. In 17 of these cases some nasal affection was present, viz.: deviation of the septum, 10; chronic catarrhal rhinitis, 6; chronic hypertrophic, rhinitis, 5; acute catarrhal rhinitis, 4; chronic atrophic rhinitis, 3. Twenty-two cures are reported by use of the cocaine and resorcin solution alone. The remainder underwent various forms of treatment. Adenoid vegetations were removed in 3 of the cases. The average duration of the disease was eight days.

Of acute supuration of the middle ear 42 cases are reported, of which 37 were cured. Nasal affections complicated fifty per cent. of the cases, of which acute catarrhal rhinitis and chronic hypertrophic tonsilitis head the list with 5 cases each; next follows chronic catarrhal rhinitis hypert. and acute catarrhal pharyngitis with four cases each; then follow adenoids, acute catarrhal tonsilitis, and chronic atrophic rhinitis with 3, 2, and 1 case respectively.

One case that presented both adenoids and hypertrophied tonsils was operated under general anæsthesia, and the obstructions removed. Recovery followed with no other treatment, the hearing being restored to normal. The treatment in the other cases consisted in the removal of all granulation tissue and cholesteatomatous masses, and the furnishing of the patient with a box containing an "Ideal" soft rubber ear syringe, a two-ounce bottle of hydrogen dioxide, a dropper, a package of cotton and some wooden toothpicks, with the following directions for their use:

1. Syringe out the ear with warm water six times.

2. Drop a dropper full of the drops into the ear with the head on one side ; allow them to remain in the ear for five minutes.
3. Syringe the ear again.
4. More drops.
5. Syringe the ear a third time.
6. Dry thoroughly with cotton.
7. Do this twice a day.

One hundred and ninety-one of chronic suppuration of the middle ear are reported, with the following results :

Cured for discharge, 62=32.5 per cent.

Cured for hearing, 23=12 per cent.

Improved for discharge, 43=22 per cent.

Improved for hearing, 32=17 per cent.

Not reported for discharge, 79.

Not reported for hearing, 136.

Many of the latter were still under observation at the time of the report, while a large number failed to return for further treatment.

The routine treatment was the same as that for acute suppuration. A five per cent. solution of aluminol in alcohol was used locally in suppurative conditions: its effect being to lessen the amount of the discharge and change its character to a mucoid, which did not give rise to fetor after remaining in the ear for some length of time. Granulation masses were removed with the curette or snare, or were touched with (1) a solution composed of equal parts of iodine and carbolic acid, or (2) ortho-chlor-phenol applied carefully to the granulations and immediately wiped dry. The last mentioned drug is a volatile liquid, readily miscible with glycerine in all proportions, and is a rapid but superficial caustic and deodorizer: it also possesses anæsthetic properties.

Chronic catarrh of the middle ear claims 218 cases, of which 198 were hypertrophic, 9 atrophic, and 11 adhesive. Cures reported number 21, improvement in 74, unimproved 11, 112 not reported.

The treatment consisted chiefly in politizerization, catheterization, and the use of the Delstanche and Siegel instruments. Removal of the ossicles was not practiced in any case, as the operation was not looked upon with favor. In the atrophic form, considerable success attended the use of Mandl's solution

(iodine gr. ii; potass. iod. gr. xii; glycerine $\frac{3}{4}$ i) applied to the naso-pharynx, accompanied by the use of a 10 per cent. ichthyol ointment (unguentum nasalis) applied by the patient twice daily. All cases reported as cured had undergone treatment for the nasal or pharyngeal affection present, while beneficial results were not marked in those cases in which such treatment was not adopted.

Thirty-five cases of disease of the internal ear are recorded with 3 cures. Improvement was noticed in 7, no improvement in 4, while 21 failed to report.

As far as could be ascertained 3 were due to syphilis and and 2 to cinchonism: the cause could not be determined in the remainder. The best results were obtained from gradually increasing doses iodide of potash, sometimes supplemented by strychnine, and from pilocarpin. Electricity gave negative results in the cases in which it was given a trial.

A case diagnosed as hemorrhage into the labyrinth, in which there was sudden and persistent tinnitus as from escaping steam, followed by almost total deafness with vertigo and a "tight feeling" about the head, made a perfect recovery under the iodide of potash.

RITCHIE.

Berens, T. Passmore.—Ichthyol in Rhinitis Atrophica Fœtida and in Laryngitis Tuberculosa.—*Manhattan Eye and Ear Hospital Reports*, January, 1895.

After a short account of the action of ichthyol (sulpho-ichthyolate of ammonium) upon mucous membranes, followed by some extracts from the history of its use, the author describes the method employed by him since 1893 in the treatment of atrophic rhinitis with ozena. A large cotton tampon saturated with pure ichthyol is introduced into each nostril and allowed to remain there fifteen minutes. The copious secretion produced, causes the easy expulsion of most of the scabs. The cleansed membrane is then rubbed (massaged) in every attainable part with a small tampon, saturated with the pure drug. The large tampon is not used in mild cases. After the disease is under control, an ointment consisting of ten per cent. ichthyol and five per cent. eucalyptol in vasaline is given to the patient to use daily.

The seventy cases collected are classified as follows:

"1. Slight atrophy with pharyngitis sicca, scabs, and odor.

"2. Advanced atrophy with pharyngitis sicca and often laryngitis sicca, scabs, and odor.

"3. Very advanced general atrophy with almost complete loss of the turbinates. Much odor and large offensive scabs. Marked scabbing in pharynx and laryngitis sicca, with or without scabs.

"In Class I, of the 18 patients treated, 11 were 'much improved,' and 7 improved.

"In Class II, of the 28 patients treated, 17 were 'much improved,' 5 were improved, and 6 not improved.

"In Class III, of the 31 cases treated, 10 were 'much improved,' 12 improved, and 9 not improved. Of the total number—78—treated, there were 38 'much improved,' 24 improved, and only 15 not improved. Of these 15 it may be stated that they were very irregular in attendance, frequently remaining a month with no treatment whatever, so that the treatment did not have a fair trial."

The cases of laryngeal tuberculosis were treated by rubbing the diseased surface thoroughly with pure ichthyol, and in those cited, removal of the laryngeal condition or marked improvement was reported.

PEARSALL.

Stein (Moscow).—A Case of Gangrena Faucium Primaria.—*Monatssch. für Ohrenheilk.*, November 5, 1894.

The patient a child of twelve years, had complained for six months of fever accompanied with dyspnœa. Physical examination showed disease of the heart. The speech had a nasal *timbre*, but examination of the nose and throat showed nothing. About two weeks later, dysphagia appeared together with swelling of the glands of the neck, and swelling of the left tonsil with extreme fetor of the breath. This process continued during the next two weeks, when the palate, uvula and left tonsil were found changed to a black, ichorous mass having an awful fetor. The child died in about three weeks.

The *post-mortem* showed hydrops pericardii, pneumonia, and complete gangrenous destruction of the pharynx and nasopharynx.

PEARSALL.

Parker, C. A.—Case of Tuberculous Ulceration of the Nose and Pharynx.—*Journ. of Laryngol.*, July, 1895.

A portion of the inferior turbinated bone was removed by the cold snare to relieve a stoppage in the nose of two or three years' standing. Some epistaxis occurred two or three days later.

About two weeks after the operation ulceration was discovered over the inferior turbinated, which spread and finally attacked the pharynx. Simple means of treatment were of no avail. Later, the curette was used and the ulcerated surface frequently painted with lactic acid. Under this treatment he improved very rapidly.

Examination of the chest showed the presence of incipient phthisis, which also improved under treatment. PEARSALL.

Moffat, J. L.—Death After Cataract Extraction.

Male, aged seventy-five. A typical red-faced Englishman had an over-ripe "black" cataract in the right eye. Good light projection. R. V. a moving hand. T-1 Could get no reflex with the ophthalmoscope. Upon admission a marked mitral murmur was found. Urinalysis, negative. After death we learned that he was a steady whisky drinker, but not a drunkard.

Atropine, 4 grs. to the oz., was instilled several times on the day of operation; mydriasis moderate, sphincter rigid. Antiseptic toilet with bichloride 1-4000. About 5 minims of a four per cent. sol. of cocaine mur. were administered in repeated instillations, one of which was just previous to the iridectomy. Incision, Liebreich upward; iridectomy upward; extraction with loop; slight escape of vitreous. Crater collapse of cornea, anterior chamber very slow to refill. Conjunctival sac flushed with saturated solution boric acid; gold-beater's skin plaster and bandage to both eyes.

On sitting up face deeply congested, no vertigo. In an hour he began to be delirious, constantly muttering and shouting at times, tried to remove bandage and escape from the ward. Refused medicine and nourishment; had to be tied in bed. During height of delirium, face flushed, pulse full and quick; no rise in temperature. R. Belladonna³⁰ two hours. November 11, Liquid food forced; P. M., at times soporous between the paroxysms of noise and restlessness. Involuntary urination and defecation. The next afternoon more maniacal; spits at those about him, tries to uncover himself; worse when talked to. R. Hyos.⁹ one hour. This seemed to be followed by slight general improvement. November 13, much exhausted; still shouts at times, especially if he hears a noise. The next night was comparatively quiet, but in the morning his strength and pulse failed,

œdema of the lungs set in and, in spite of stimulation, he died, ninety hours after the operation.

Autopsy: Brain-dura very thick. Cortex externally, large milky patches along the longitudinal fissure. Marked congestion of the cortex. Excess of fluid in each lateral ventricle. Choroid plexus very much congested. Lungs—Very œdematous, pleural fluid scanty. Heart—Scant pericardial fluid. Mitral valve dilated (admitting five fingers) with calcareous plates. Atheroma of the arch of the aorta. Ventricle dilated, columnæ carnæ thickened. Liver—Fatty degeneration. Excess of fat about the heart, kidneys and abdominal walls. Fatty infiltration of the mesentery and suprarenal capsules.

DEADY.

Brugger, Dr. Oscar.—Hyaline and Amyloid Degeneration, with Calcareous Degeneration and Ossification in an Ocular Muscle after an Injury.—*Archives of Ophthalmology*, vol. xxiv. No. 1.

A rare and interesting case of the above is described by Brugger. The patient, a female of fifty-seven years, received a wound in the right eye from the horn of a cow, which was followed by a marked extravasation of blood in the tissues. Sixteen years afterward she was treated for paralysis of the muscles of the eye, at which time a tumor occupying the site of the injury was discovered. Two years later she came under the observation of Brugger, who found a subconjunctival growth occupying the location of the superior rectus muscle and extending backward for some distance from its insertion. It was of the thickness of the finger, hard, freely movable and unattached to either the globe or orbit. On puncture it appeared to be bony. The eyeball was displaced downward and forward and was covered by the upper lid which was in a state of ptosis.

The conjunctiva was incised and the muscle severed from its attachment, the tumor dissected out and the muscle reattached, which operation caused the eyeball to resume its normal direction. The ptosis gradually improved and the patient was discharged cured, twenty-six days after the operation.

On examination the growth was found to be composed of a network of connective tissue, blood vessels, muscular fibers, and bone corpuscles, together with the products of hyaline, amyloid and calcareous degeneration.

RITCHIE.

Townsend, Dr. Irving.—*Ignatia in Supraorbital Neuralgia.*—*N. Y. Hom. Materia Medica Society, North Am. Journ. of Homeopathy*, May, 1895.

The writer reports a case of supraorbital neuralgia of the right side, of years' standing, occurring in a male of twenty-two years. The pain was "sharp, intense and agonizing" in character, lasting from one to two hours, accompanied by engorgement of the conjunctival vessels of the same side, and followed exposure to drafts of air. The pain commenced over the right eye and extended toward the temple of the same side. The patient's general health was unimpaired; vision good, with slight astigmatism. A cure, which has attested its permanency by a complete absence of the pain for the past three years, was effected by the exhibition of a few doses of *ignatia* 6.

RITCHIE.

Sheild, A. Marmaduke.—*Note of a Case of Salivary Calculus, Presenting Unusual Symptoms.*—*Brit. Med. Journ.*, April 27, 1895.

The patient, a gentleman between thirty and forty, presented a hard, livid and painful swelling in the floor of the mouth, just to the left of the tongue. At one point there appeared a fungating excrescence, resembling carcinomatous ulceration. In the accompanying submaxillary region was a small tumor, "about the size of a small potato." The patient complained of much increase of pain after eating, which pointed to the possibility of a blocked salivary duct. A fine needle inserted into the swelling, showed the presence of a calculus at a considerable depth. Operation was advised but not permitted. In about ten days a piece of the calculus, about the size of half an almond, was discharged. In a few days the remaining fragments passed off by ulceration and was followed by the disappearance of the swelling and healing of the wound. The peculiar fungoid growth was similar to the granulation accompanying necrosed bone, while the swelling induration and pain were due to the retention of the salivary secretion.

PEARSALL.

Von Gernet.—*Contribution to the Treatment of Myxædema.*—*Deutsche Zeitschr. für Chir.*, Band 39, Hefte 5 und 6.

The patient, a woman forty years old, who had suffered from

myxœdema for six years, had tried many methods of treatment without success, the thyroid gland of a sheep was implanted beneath the pectoral muscle, and all symptoms of the disease disappeared for several months. Later, there was a recurrence and the internal administration of the thyroid gland was tried, followed by the disappearance of all the symptoms. The patient takes 1.85 gram twice a week. A larger dose produces palpitation and ringing in the ears. Unless the symptoms recur, she takes but half a gram at a time. The writer believes that the continued use of this treatment will prove injurious.

PEARSALL.

Mendel.—Three Cured Cases of Myxœdema.—
Deutsche Med. Wochenschr., No. 7, 1895.

The author describes three cases of myxœdema which were cured by the internal use of thyroid tablets. To prevent a return of the symptoms, the patients are obliged to continue the use of the tablets from time to time.

PEARSALL.

Thomson.—A Case of Interstitial Keratitis with Synovitis. Both Being Unilateral.—*London Lancet*, April 6, 1895, p. 860.

In support of the theory of the connection existing between interstitial keratitis and synovitis, the author cites a case in a girl of sixteen, suffering from amenorrhœa and anæmia. While the case was under treatment the right eye became inflamed, with the characteristic symptoms of diffuse grayish infiltration and isolated opacities, under a normal epithelium, advancing from the periphery toward the center of the membrane, with dense ciliary congestion. Anterior chamber free from deposit. Full dilatation of pupil under atropin. Within a week effusion into the right knee joint developed. The swelling was not tense, was evenly distributed, and painless; passive motion was not impeded and the skin was of normal color. No fever; no evidence of syphilis in physical signs or family history. The synovitis lasted six months and disappeared of itself, treatment having no effect; the keratitis ran the usual course, the cornea becoming normal, except for a slight central haziness, in about a year. The patient was under observation for nine years, with no return.

DEADY.

Balis, *Medical Record*, May 4, 1895, p. 571, reports four cases of pterygium cured with an eyewash of bichloride of mercury (1-4000) combined with cocaine and morphia.

DEADY.

Baker.—A Unique Case of Combined Antrum and Mastoid Disease.—*Medical Record*, March 9, 1895, p. 303.

In this case the patient, suffering from ozena, snuffed cold water from the hand into the nose, with the result that the infection from the nasal disease was carried to the middle ear, by way of the eustachian tube. Immediately pain in the left ear was felt, which increased until the rupture of the tympanic membrane occurred, but no relief was obtained and swelling of the mastoid region rapidly followed. Both the mastoid and the antrum of Highmore were drained, a little pus being found in the former and a large quantity of foul purulent secretion in the latter. Drainage was established and the parts were irrigated with dilute hydrogen dioxide, followed by potassium permanganate solution, under which the mastoid affection rapidly healed, the disease of the antrum being still under treatment.

DEADY.

Kalisher.—Nerve Supply of Polyps.—*Archiv f. Laryngol*, No. 2, 1894.

The author notes the scarcity of reference to the subject, and gives in detail the improved technical methods, by which he is able to show the nerve distribution of polyps. The nerve fibers enter through the pedicle and proceed to the center of the growth, thence spreading to the periphery. As a rule they branch but little, although they sometimes form, near the surface, a plexus like that found in the mucous membrane.

PEARSALL.

Freeman, Walter J.—A Method of Holding Children for Throat and Nose Treatment.—*Phila. Polyclin.*, March 23, 1895.

The child is taken upon the lap of the assistant, whose arms pass beneath those of the patient and are clasped above his head. In his way the more the child struggles the more the assistant's hands are pressed down, and the more firmly the child is held. The patient's legs are held between the knees of the assistant, so that kicking is almost entirely prevented.

The author has used this method for several years and finds it most satisfactory even for delicate operations.

PEARSALL.

Smith.—Peculiar Perversion of the Color Perception.—*Medical Record*, March 9, 1895, p. 289.

In a very interesting case, diagnosed as a lesion of the left optic thalamus, which is given with the fullest detail, there was found, together with a neuro-retinitis and a marked limitation of the peripheral field, a peculiar perversion of the color sense.

"Selects colors correctly as to shade, but each appears in its complementary, *i. e.*, red is called green, green appears as red. Blue looks like yellow and yellow, blue. White appears brown. Has micropsia and metamorphopsia." Under potassium iodide, followed by tonics, the case rapidly improved, vision becoming normal, with the disappearance of the micropsia and metamorphopsia, and finally of the color defect.

DEADY.

Tchemolossow.—A Contribution to the Bacteriology and Pathological Anatomy of Granular Conjunctivitis.—*Revue Méd. Maritime* (supplement), May, 1895.

In his researches in bacteriology and pathological anatomy, the author reaches the conclusion that it is impossible to distinguish follicular catarrh from trachoma. The anatomical changes are the same, the specific microbe does not always exist, and, when found, it is the same in both diseases. The only difference in these two morbid processes consists in the final changes in the granulation tissue. At the commencement it cannot be foretold whether the granulations will disappear, leaving no trace, or whether changes will take place, resulting in the formation of cicatricial tissue. The cause of granulation in conjunctivitis being still unknown, the anatomical structure of granulations being entirely different from that of follicles, the author proposes that the name "conjunctivitis acuta et chronica" be given to recent cases, reserving that of trachoma for the cicatricial period of the disease.

DEADY.

Sureau (Paris).—Superficial Cauterization of the Cornea in Cases of Corneal Infiltration following Purulent Ophthalmia.—*Rev. Gen. d'Ophthalmology*, No. 7, 1895.

As a last resource, in cases of purulent ophthalmia of the newborn, where all treatment has failed and the cornea is infiltrated, softened and disintegrated, the author recommends superficial cauterization of the diseased surface. In two unfortunate cases, considered hopeless, the result surpassed all possible expectations.

DEADY.

Water-damaged August 1978.

Frozen and vacuum freeze-dried 1979.

